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By

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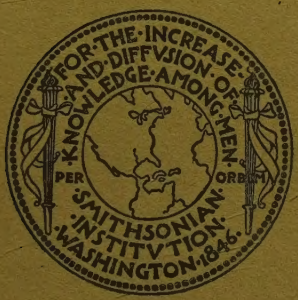
No. 3181.—From the Proceedings of the United States National Museum
Vol. 95, pp. 235–367



SMITHSONIAN INSTITUTION
UNITED STATES NATIONAL MUSEUM
WASHINGTON, D. C.
1944

PROCEEDINGS OF THE UNITED STATES NATIONAL MUSEUM

issued by the

SMITHSONIAN INSTITUTION
U. S. NATIONAL MUSEUM

Vol. 95 Washington: 1944 No. 3181

THE FISHES OF THE FAMILY CHARACINIDAE FROM VENEZUELA, WITH DESCRIPTIONS OF SEVENTEEN NEW FORMS

By Leonard P. Schultz [1]

This report on the family Characinidae is the second contribution on the fishes of Venezuela resulting from my expedition to that country to study the fish fauna, mostly of the Maracaibo Basin, in February through May 1942. This work was undertaken at the invitation of Dr. Guillermo Zuloaga, assistant chief of explorations, Standard Oil Co. of Venezuela, now the Creole Petroleum Corporation, and was made possible through the cooperation of the Smithsonian Institution and the Department of State. I was a guest at the camps of the Standard Oil Co. of Venezuela and of the Lago Petroleum Corporation, Lago de Maracaibo, and to the officials of these companies grateful acknowledgment is made for their help and hospitality.

The previous report,[2] which treated the 12 families of catfishes, or bagre, reported from Venezuela, gave the details of my itinerary and a list of the stations where specimens were collected. These data apply as well to the present paper. The map of the Maracaibo Basin, showing collecting localities visited and other localities recorded, is reproduced on page 367, figure 56.

In all, 8,342 specimens of characins were collected in the Maracaibo Basin and in other Venezuelan localities, and these form the basis of

[1] Drawings of the new fishes reproduced herein were made by Mrs. Aime M. Awl, artist, U. S. National Museum.

[2] Proc. U. S. Nat. Mus., vol. 94, pp. 173-338, 5 figs., 14 pls., 1944.

this report. Specimens already in the collections of the United States National Museum were also used, and a few others were borrowed for study from the California Academy of Sciences, the American Museum of Natural History, the Chicago Natural History Museum, the Natural History Museum of Stanford University, and from Dr. William Beebe, New York Zoological Society.

There are recorded herein from Venezuela 58 genera and 117 species and subspecies of the Characinidae. These numbers should be considerably increased when adequate and further collecting of fishes is done in the Orinoco River system and in the coastal drainages of Venezuela. Three genera (one from the Orinoco system) and 17 species and subspecies (12 from the Maracaibo Basin and 5 from the Orinoco drainage) are here described as new to science. I was able to collect only in certain restricted regions of the Maracaibo Basin, and there is little doubt that many more new forms will be revealed when further collections are made in that basin.

At present, 29 species of characins are known from the Maracaibo Basin, and only two of these are found in the Orinoco system. One, *Hoplias malabaricus*, appears to be the same form along the coast from the Magdalena system to Brazil; but the other, a *Creagrutus*, may prove to be a distinct subspecies when the series from the Orinoco system are carefully compared with those from the Maracaibo Basin. Several species show close relationships with similar ones in the Magdalena River system. The only species reported from the Maracaibo Basin but not obtained by me is *Piabucina erythrinoides*, and this comes from a locality I did not visit.

Except in a few instances, subfamilies of the Characinidae as used by authors are omitted from the present treatment because they are not well defined.

No attempt will be made to discuss the distribution of the freshwater fishes of Venezuela until the other groups represented in the collections have been studied.

DEFINITION OF TERMS

Terms used in this report are defined as follows:

Standard length is measured from tip of snout to midbase of caudal fin; *length of head* is the distance from tip of snout to rear end of fleshy operculum; *depth* is greatest depth of body; *snout* is from tip of snout to front of eye; *distance between nostrils* or *nostrils to eye* is measured from edge of nasal openings; *interorbital space* is fleshy distance between eyes; *postorbital* length of head is distance from eye to rear end of fleshy operculum; *caudal peduncle length* is measured from base of last anal ray to midbase of caudal fin; distances involving the *anus* are measured from center of anus.

It appears necessary to explain my methods of counting and recording fin rays both for the characins and for the Nematognathi reported upon previously. The use of small Roman numerals for the simple unbranched soft rays of all fins was not without precedent and was not intended to represent the evolution or homologies of true spines or soft rays but was adopted as a practical means of indicating the fact that the first soft rays are often unbranched, flexible, and nonpungent. Furthermore, I find that the separation of the unbranched from the branched rays, especially for the pectoral fins, is of prime importance in distinguishing genera and species. Many authors have wholly neglected to study the pectoral fin rays, thereby missing a valuable diagnostic character. In characins, counting only the branched or principal rays is not adequate, though most authors agree that it is a sufficient count in American Cyprinidae. I did not observe that the number of unbranched or branched rays of characins or Nematognathi changed with age, as has been noted in certain groups of fishes.

Simple, unbranched soft rays are represented by small Roman numerals and the *branched soft rays* by Arabic numerals thus: iii, 8. Pungent spines are represented by large Roman numerals, although no true spines occur in the Characinidae. In the case of the caudal fin only branched soft rays were counted, and these are sometimes separated in a formula, as 9+8, which indicates 9 rays in dorsal part of caudal fin and 8 in the lower lobe.

I counted all rudimentary rays in the dorsal, anal, pectoral, and pelvic fins and counted as a single ray each that had a separate base. In cases where the last ray was divided at the base, this was counted as one ray. However, many of the genera and species reported upon here did not have the last ray of either dorsal or anal fins divided at the base.

Other terms will be found self-explanatory as the species involved are carefully studied.

Order HETEROGNATHI

Family CHARACINIDAE

The Characinidae belong to the great group of ostariophysan fishes having the Weberian apparatus, which consists of the first four vertebrae modified into a series of bony ossicles that connect the air bladder with the auditory apparatus or ear.

This diverse family of fresh-water fishes, found in both Africa and South America, is most closely related to the Nematognathi, or catfishes, and to the Cyprinidae. The characinids have evolved so many diverse elements and specialized forms in this vast territory that the family cannot be defined by any one character; instead, we

are forced to "content ourselves with a combination of characters" summarized below:

Mouth usually bordered by premaxillaries in the middle and maxillaries on the sides; teeth usually present on the jaws, only rarely on the palatine bones; soft rayed dorsal fin, usually followed by an adipose fin; body covered with scales; head naked; branchiostegal rays 3 to 5; gill arches 4; pseudobranchia lacking or rudimentary and glandular; coracoid sometimes forming a ventral ridge; pelvic rays usually number 10 to 13; the first ray of pectoral, dorsal, and anal rays but rarely ossified and never forming a sharp spine as in the Nematognathi; air bladder always divided into two parts by a constriction, anterior part smallest; usually about 10 to 40 caeca on stomach; intestines short or very long in herbivorous forms.

ARTIFICIAL KEY TO THE GENERA AND TO CERTAIN SUBFAMILIES OF CHARACINIDAE REPORTED FROM VENEZUELA

1*a*. No teeth in either jaw and none on lips; nares close together, separated by a dermal flap; lateral line complete, straight, along midaxis of body; intestine greatly coiled, very long; caudal fin forked; adipose fin present.

2*a*. Caudal lobes densely scaled to near tips; preventral area flat with a median series of scales and blunt lateral keels; postpelvic area with a median keel and two lateral keels converging toward anal, less developed in young---------- **Curimatella** Eigenmann and Eigenmann (p. 248)

2*b*. Caudal fin scaled only a short distance out from base; gill membranes joined with each other and with a narrow free fold moderately forward on isthmus; lower jaw oblique, with hard edge; interorbital convex.

3*a*. Roof of mouth with folds of tissue and sometimes with papillae; predorsal plate absent; gill rakers short, numerous; low midventral ridge present from pelvics to anus but not well developed; scales large. **Curimata** Walbaum (p. 249)

3*b*. Roof of mouth normal, without dermal folds or papillae; predorsal plate minute, bilobed; no scales in midline except middle third of length in young; gill rakers absent anteriorly, represented by a dermal fold; scales small; midventral ridge from anus to pelvics well developed. **Anodus** Agassiz (p. 251)

1*b*. Teeth present in one or both jaws or on the lips.

4*a*. Abdomen keeled, with a median series of sharp-edged bony plates with backward-directed points; body much compressed; anal base oblique, long; dorsal base long; scales small; a naked predorsal line; teeth strong, in one or two series in both jaws, usually with sharp cutting edges (*Serrasalminae*).

5*a*. Teeth in a single series in both jaws; teeth with a strong median cusp and with either a single lateral cusp or a pair, those of upper jaw mostly asymmetrical---------- **Serrasalmus** Lacepède (p. 254)

5*b*. Premaxillary teeth in two series; mandibulary teeth in a single series; sometimes a pair of conical teeth behind and in contact with symphyseal mandibulary teeth; abdomen serrated before and behind pelvics; teeth more or less close-set, either incisorlike or with an oblique cutting edge or molariform; each premaxillary with 5 teeth in the outer and 2 in the inner series; jaws equal or lower jaw a little projecting; conical mandibulary teeth present.

6*a*. No predorsal spine.

7*a*. Supplementary scales, if present, small and confined to hinder edges of primary scales; anal fin with a basal sheath of scales and with highest rays anteriorly.....**Colossoma** Eigenmann (p. 255)

7*b*. Numerous supplementary scales which may obscure the primary ones; anal fin densely scaled in at least its basal half and with highest rays posteriorly or of nearly equal length posteriorly and anteriorly.....**Mylossoma** Eigenmann and Kennedy (p. 256)

6*b*. A predorsal spine present; base of adipose fin less than half as long as that of rayed dorsal; dorsal with 22 rays or more; anterior teeth of outer series of premaxillary with an oblique cutting edge, not greatly compressed, generally more or less separated from those of inner series.....**Myloplus** Gill (p. 258)

4*b*. Abdomen rounded or flattish or if keeled the median ridge lacking backward-directed points.

8*a*. Both dorsal and anal origins in last third of standard length, body very elongate, narrow, with a pikelike mouth, belly rounded and having no keel; interorbital space flattish; pointed snout about as long as greatest depth of body; gill membranes extending far forward, free from each other and from isthmus; teeth conical, in a single row in both jaws; caudal fin forked (*Ctenolucinae*).

9*a*. Numerous small, close-set, conical teeth in a single row, hooked backward on premaxillary, and meeting at tip of jaw to form a rounded expansion with somewhat enlarged teeth; 3–3 vomerine teeth opposite constricted portion of premaxillary; front sides of lower jaw with a barbellike flap of skin; anal origin under middle of dorsal base; dorsal origin almost equal distance from pelvic insertion to midcaudal base; last anal ray not filamentous; scales ctenoid.
Ctenolucius Gill (p. 258)

9*b*. Numerous small conical teeth in a single row, hooked backward, meeting at a point or acute angle behind projecting fleshy tip of snout; no vomerine teeth; no flap of skin at front of lower jaw; anal origin behind base of dorsal fin; dorsal origin 6 or 7 times closer to a vertical through pelvic origin than one through midcaudal base; last anal rays filamentous, at least in young; scales probably cycloid.....**Boulengerella** Eigenmann (p. 261)

8*b*. Dorsal or anal origins or both in middle third of standard length; snout not pikelike.

10*a*. Numerous fine, incisorlike teeth on margins of lips, then a curved V-shaped row at front of both jaws; mouth protractile; scales rough; a conspicuous bispinous predorsal plate; a rather strong midventral ridge from pelvics to anus; interorbital convex; gill membranes joined, and narrowly joined to isthmus.
Prochilodus Agassiz (p. 261)

10*b*. No fine teeth on margins of lips.

11*a*. Gill membranes firmly joined to isthmus without a free fold across it and none of teeth canines; lateral line complete, straight; adipose fin present; caudal fin forked.

12*a*. Fourth gill arch dilated behind; anterior side of fifth gill arch with its surface corrugated or plicated; each jaw with about 12 feeble incisorlike teeth in fleshy lips; mouth not protractile, rather small, terminal; gill rakers minute.
Chilodus Müller and Troschel (p. 265)

12*b*. Fourth gill arch normal.

13*a*. Nostrils close together and separated only by a dermal flap; 4 teeth with broad cutting edges projecting forward in each side of both jaws; basal two-thirds of caudal lobes scaled; lips reflected with a free margin on both jaws, the lower lip lobed; anal short, without basal sheath of scales.

Leporellus Lütken (p. 265)

13*b*. Nostrils rather widely separated by an isthmus of skin, the anterior nostril somewhat tubular; predorsal plate absent.

14*a*. Mouth small, terminal, or inferior, with 4 to 6 teeth on each side of both jaws directed obliquely forward toward middle, these teeth obliquely truncate or lobed; anal short; snout conical; second suborbital not covering more than half of cheek; lips somewhat plicate.

Leporinus Agassiz (p. 267)

14*b*. Mouth opening vertical or nearly so, narrow and elongate, lower jaw folding upward to close mouth; lower jaw bearing at its tip 2 large, hooked, projecting teeth, sickle-shaped at tips; upper jaw with 3 or 4 spear-shaped teeth on each side directed forward.

Gnathodolus Myers (p. 268)

14*c*. Mouth small, terminal or oblique, with incisorlike teeth lobed or not in a single series of 8 in each jaw, those at front of lower jaw not directed forward toward middle; lips not plicate.

15*a*. Middle teeth of lower jaw trifid, with three points; mouth terminal, somewhat oblique (fig. 31, *a*).

Schizodon Agassiz (p. 268)

15*b*. Middle teeth of lower jaw incisors with truncate edge; mouth terminal, oblique----**Laemolyta** Cope (p. 272)

11*b*. Gill membranes extending far forward and free from isthmus or narrowly joined far forward, sometimes with a free fold across isthmus, or sometimes broadly joined to each other with a wide free fold across isthmus.

16*a*. Midline of belly with a keel or ridge in front of pelvics; abdominal region sometimes greatly compressed to an edge, or trenchant; anterior and posterior nasal openings close together, separated only by a dermal flap.

17*a*. Lateral line complete.

18*a*. Lateral line nearly straight along midaxis of body; mouth large, gape oblique, teeth conical, sharp, long canines present; gill membranes separated, free from isthmus.

19*a*. Anal fin covered with minute scales nearly to their tips, caudal fin with minute scales basally; scales minute.

20*a*. Dorsal origin considerably in front of anal origin.

Hydrolycus Müller and Troschel (p. 272)

20*b*. Dorsal origin behind anal origin and both far behind middle of elongate body; dorsal profile nearly straight, ventral profile curved to under pectorals, then nearly straight; belly much compressed, ventral edge thin----------**Rhaphiodon** Agassiz (p. 273)

19*b*. Anal base with a sheath of scales consisting of about 2 rows; caudal fin base not with minute scales; anal rays iv, 40 to iv, 49; dorsal origin a little behind anal origin;

dorsal profile concave at occiput; scales moderate in size, about 58 to 74--**Gilbertolus** Eigenmann (p. 302)

18*b*. Lateral line decurved, closer to anal base than to midaxis of body; preventral area trenchant, moderately enlarged; dentary with strong triangular multipointed teeth at front of jaw and small ones at sides; inner row consisting of 2 conical teeth at symphysis; premaxillary with 2 or 3 irregular rows of teeth, second suborbital not covering cheek, adipose fin present; gill membranes separated, free from isthmus-**Triportheus** Cope (p. 273)

17*b*. Lateral line incomplete.

21*a*. Lateral line deflected to before anal origin; gill membranes narrowly joined and with a narrow free fold across isthmus; preventral area compressed, trenchant, greatly expanded; pectorals large, saillike; body very short and deep (*Gasteropelecinae*).

22*a*. No adipose fin; maxillary with a single tooth.
Carnegiella Eigenmann (p. 275)

22*b*. Adipose fin present, well developed; maxillary with 3 to 5 teeth; premaxillary with a single row of tricuspid teeth; anterior profile straight-**Thoracocharax** Fowler (p. 275)

21*b*. Lateral line ending near midaxis of body but not deflected to in front of anal; gill membranes free from isthmus without a free fold; preventral area trenchant but not expanded; anal sheath of 2 to 2½ scales; dorsal origin over about the base of fifth or sixth branched anal ray; teeth in a single series in both jaws, tripointed, no canines-------**Paragoniates** Steindachner (pp. 309, 311)

16*b*. Midline of belly not trenchant and without a median keel or ridge in front of pelvics; belly rounded or flattish.

23*a*. First 3 or 4 rays of pectoral fins simple, unbranched, somewhat enlarged; gill membranes free from each other and from isthmus; lateral line complete; only slightly decurved anteriorly; teeth nearly conical or tricuspid, in a single row on premaxillary and a similar row on dentary; an inner row of minute teeth occurring on dentary along inner bases of larger outer row, these visible if lower jaw of specimens is partially dried; adipose fin present; second suborbital not covering cheek----------**Characidium** Reinhardt (p. 276)

23*b*. Only first or second ray of pectoral fin simple; if first two simple, then middle of lower jaw toothless.

24*a*. No teeth on middle of lower jaw, which is hard-edged, but teeth sometimes occurring at sides of jaw; premaxillary teeth spatulate, minutely denticulated; gill membranes broadly joined but with a broad free fold across isthmus; adipose fin present; caudal fin forked; caudal fin lobes with scales about halfway out; pelvics with axillary scale; lateral line complete, straight; mouth subterminal or inferior; teeth in upper jaw usually 2+8+2 (2 teeth on each maxillary); upper lip not free but forming part of the flesh between bases of teeth; pectoral fin rays i, 11 to i, 16; usually 3 teeth on each side of lower jaw (*Parodontinae*).
Parodon Valenciennes (p. 288)

24*b*. No teeth on lower jaw, but upper jaw with a single row of 20 to 30 pluricuspid, incisorlike teeth; gill membranes free from each other and from isthmus; lateral line complete; premaxillary not protractile; eye in a sheath or adipose lid with small circular opening; pelvics inserted under middle of dorsal base and dorsal origin closer to snout than base of caudal fin----------**Hemiodus** Müller (p. 291)

24*c*. Middle of lower jaw with teeth and without hard cartilaginous edge.

25*a*. Teeth in two rows in lower jaw, inner row sometimes represented by a pair of teeth near symphysis or a row of minute teeth; pelvics inserted in front of a vertical line through dorsal origin.

26*a*. Adipose fin present.

27*a*. Teeth on premaxillary in one or two rows, the inner row on dentary formed by a series of minute teeth directed inward.

28*a*. No canines in either jaw; gill membranes free from isthmus but partially united forward with a narrow free fold across it; base of anal fin with a sheath of scales.

29*a*. Teeth tricuspid; premaxillary teeth in one row, those at front similar to outer row of dentary and numbering 9 to 11 on a side; caudal fin scaled two-thirds the way out, only a wide margin scaleless; upper caudal lobe longest; lateral line obsolete.

Piabucina Valenciennes (p. 291)

29*b*. Teeth conical, short, in two rows in both jaws; maxillary with a single row along its entire edge; maxillary slipping under preorbital and reaching to rear of eye; lateral line complete, a little decurved anteriorly; caudal scaled a a little at its midbase.

Salminus Agassiz (p. 293)

28*b*. Both jaws with several canine teeth as follows: 2 pairs on premaxillaries and 4 or 5 pairs on dentaries; no small conical teeth between canines on lower jaw; inner series of teeth of dentary confined to front of jaw; anterior half of upper portion of first gill arch with rough plates instead of elongate gill rakers.

Cynopotamus Valenciennes (p. 295)

27*b*. Teeth tricuspid, in 3 rows on premaxillaries, inner row on dentary formed by a pair of enlarged teeth at symphysis; maxillary long, narrow with a series of teeth along its entire edge; lower jaw included; gill rakers numerous, slender; lateral line complete; dorsal origin in front of that of anal.

Brycon Müller and Troschel (p. 307)

26*b*. Adipose fin absent; top of head flat; no canines; lower jaw longest, mouth oblique, short; dorsal fin behind middle of length of body without tail; anal with a

sheath of scales, middle rays longest; upper caudal lobe longest; nostrils separated by a flap of skin.

30*a*. Anterior edge of maxillary straight or gently convex, the point where maxillary and premaxillary join nearly straight or only slightly concave; maxillary extending obliquely to under front of eye; teeth conical, in 2 series on both jaws and these 2 series widely separated at least on males; gill membranes narrowly united forward with a narrow free fold across isthmus; a few scales occurring at bases of caudal lobes___ **Pyrrhulina** Valenciennes (p. 307)

30*b*. Anterior edge of maxillary sharply convex near its union with premaxillary and this convexity reaching a vertical line through snout tip or nearly so, thus at the point of union of maxillary and premaxillary a deeply concave space occurring; maxillary very short, nearly vertical in position and not reaching front of eye; teeth on premaxillary in a single row; two widely spaced rows of teeth on dentary of males, closer together in females; gill membranes broadly joined with each other and forming a wide free fold across isthmus.

Copeina Fowler (p. 303)

25*b*. Teeth in a single row in lower jaw.

31*a*. Outer edge of lips with bony protuberances; teeth conical in one irregular row on both jaws but no canines; body compressed; lateral line complete near midaxis of body; adipose fin present; anterior profile concave; pectoral base in a bony notch of cleithrum protected below by a bony elongation; dorsal origin near middle of length and behind the anal origin; anal fin base very long___**Roeboides** Günther (p. 303)

31*b*. Outer edges of lips fleshy without bony protuberances.

32*a*. Strong canines present in both jaws; teeth conical; a single row in lower jaw; lateral line straight; mouth large, terminal.

33*a*. Adipose fin present; body much compressed; profile of head concave; nostrils separated by a valvular flap of skin; caudal fin forked; an outer row of small conical teeth between the 2 canines on each premaxillary, inner row consisting of 2 enlarged conical teeth on each side; middle pair of canines on dentaries fanglike; pectoral shield with shallow notch.

Cyrtocharax Fowler (p. 296)

33*b*. No adipose fin; body elongate, little compressed; no fontanels; nostrils separated by skin of head so that an isthmus separates anterior and posterior nasal openings; head bony and somewhat depressed; caudal fin rounded; a single row of teeth in upper jaw.

34*a*. Maxillary with 1 or 2 short canines anteriorly, reaching past rear of eye in adults; walls of air

bladder normal; palatine teeth with an outer enlarged row, then an elongate strip along inside of enlarged row, a short patch of teeth occurring anteriorly, these separately movable from elongate strip; about 20 to 24 scales in a zigzag row around caudal peduncle.

Hoplias Gill (p. 308)

34*b*. Maxillary without a canine; walls of air bladder cellular; no enlarged row of teeth on palatines; 14 to 16 scales in a zigzag row around caudal peduncle.

35*a*. Two broad patches of teeth in roof of mouth separated by a narrow edentulous strip; pterygoids with teeth; dorsal and pelvics rounded when spread; opercle with black spot_____**Hoplerythrinus** Gill (p. 309)

35*b*. Palatines with villiform teeth in a narrow elongate band; pterygoids toothless; dorsal fin angular or pointed, the longest ray next to last; anal and pelvics pointed; rear of opercle without black spot.

Erythrinus Scopoli (p. 309)

32*b*. No canine teeth in either jaw; nostrils close together separated by a dermal flap; teeth usually 3- to 7-pointed.

36*a*. Premaxillary with a single row of teeth, sometimes one tooth on each side a little out of line with others.

37*a*. Dorsal rays about 18; mouth small, with scarcely any gape; maxillary reaching only to anterior border of eye; adipose fin present; body compressed; snout pointed; lateral line incomplete, with 5 or 6 pores; teeth tricuspid in both jaws; scales about 25, with 6 in a transverse series.

Elachocharax Myers (p. 309)

37*b*. Dorsal rays usually ii, 8 or ii, 9, never more than ii, 10.

38*a*. Anal origin in front of that of dorsal fin; anal fin with a long base, rather straight; caudal fin forked; mouth small, oblique, lower jaw projecting a little in front of upper; body compressed, thin; distance from tip of snout to rear of maxillary about 1⅓ in postorbital length of head, about equal to interorbital width, and 2 to 2½ times in distance from tip of snout to occiput; tip of snout to occiput 3 to 5 times in length of anal fin base.

39*a*. Adipose fin absent; lateral line incomplete with 9 to 16 pores.

Phenagoniates Eigenmann and Wilson (pp. 310, 311)

39*b*. Adipose fin present; lateral line complete.

Xenagoniates Myers (pp. 310, 312)

38*b*. Anal origin behind that of dorsal fin.

40*a*. Lateral line incomplete.

41*a*. Greatest depth 3⅔ to 4 times and head 4 in standard length; anal rays iii,16 or 17; scales 34 to 37, 5 or 6 above, and 3 to 3½ below lateral line; 9 to 11 pores in lateral line; 14 predorsal scales; teeth small, tricuspid; 6 teeth on each premaxillary and 12 to 14 along greater part of each maxillary; about 13 teeth on each dentary; pectorals not reaching pelvics; pelvics inserted a little in advance of dorsal origin; caudal fin brick red, when alive; no black caudal spot.

Aphyocharax Günther (p. 312)

41*b*. Greatest depth about 2½ to 3 times in standard length; about 6 to 8 pores in lateral line.

42*a*. Interhaemals not projecting on ventral side of caudal peduncle of males; caudal fin scaled out one-third its length and none of scales saclike or glandular; maxillary with minute teeth along its anterior convex edge; premaxillary row of teeth with third tooth a little out of line; about 7 pores in lateral line; mouth oblique, lower jaw a little longer and, when closed, in front of upper; a black bar across dorsal, one on front of anal fin and pelvic fins; anal rays about iii, 20 or 21.

Pristella Eigenmann (p. 312)

42*b*. Several or many interhaemals projecting on lower side of caudal peduncle of adult males; no enlarged scales on caudal fin base; about 6 to 8 pores in lateral line; teeth with about 7 points; a few teeth on maxillary.

Cheirodon Girard (p. 313)

40*b*. Lateral line complete; interhaemals not projecting.

43*a*. Teeth on premaxillary and on dentary usually 7-pointed and similar in both jaws, distal part of each tooth enlarged, much broader than its base (fig. 41*a*, *b*), sides of teeth in dentary not parallel; maxillary with 2 teeth and premaxillary usually with 5 or 6 teeth on each side.

44*a*. Lower lobe of caudal fin with a dermal sac more or less covered with a few enlarged scales (fig. 41, *c*).

Saccoderma, new genus (p. 314)

44*b*. Base of caudal fin "naked," without enlarged scales and without a dermal sac developed, scales of body ending near base of caudal fin as is usual on many species of fishes.

Odontostilbe Cope (p. 318)

43*b*. Teeth on premaxillary and on dentary not of same shape (fig. 43) but usually 5-pointed, the two outer points minute and located at lower sides of next inner point of tooth; maxillary with teeth; caudal fin with scales only at base and none enlarged, no dermal sac on lower lobe of caudal fin.

Cheirodontops, new genus (p. 319)

36*b*. Premaxillary with 2 or 3 rows of teeth, dentary with 1 row.

45*a*. Origin of dorsal fin considerably behind middle of body and considerably behind a vertical line through anal origin; lower caudal fin rays or fulcra of males free, forming a peculiar spur; caudal fin base without glandular scales; second suborbital covering cheek; 5 teeth in inner row of premaxillary; anal branched rays 25 to 32; middle rays of caudal fin usually blackish; mouth oblique, lower jaw, when closed, in front of tip of snout; lateral line decurved anteriorly; sheath of scales along anal fin base not quite complete, last few lacking. **Gephyrocharax** Eigenmann (p. 322)

45*b*. Origin of dorsal fin in front of that of anal; lower caudal rays of males not free from other caudal fin rays.

46*a*. Scales ctenoid with age and always ctenoid on prepelvic area; lateral line complete, a long tube extending out on base of middle caudal membrane, caudal fin base naked; 4, rarely 5, teeth in front row of premaxillary and 5 teeth in inner row, all teeth 3- to 5-pointed; anal rays 38 to 49.

Ctenobrycon Eigenmann (p. 326)

46*b*. Scales not ctenoid even on prepelvic area.

47*a*. Premaxillary teeth in 3 rows or if in 2 rows the teeth very irregular, with at least 2 teeth on each side out of line with the others; teeth tricuspid; lower jaw included, oblique; dorsal origin nearer snout by eye diameter than caudal base, and nearly over pelvic insertion; branched anal rays 8 to 12; caudal fin base naked.

48*a*. Lateral line incomplete, with only 9 or 10 pores just behind head; teeth arranged as in figure 46.

Creagrutops, new genus (p. 327)

48*b*. Lateral line complete.

49*a*. Teeth of upper jaw arranged as shown in figure 48.

Creagrutus Günther (p. 330)

49*b*. Teeth in upper jaw in 2 irregular rows on premaxillary, 4 large tricuspid teeth in inner row and 3 small teeth in an outer irregular row, the first and third set out and the second set back forming a middle row; maxillary with about 12 tricuspid teeth.

Creagrudite Myers (p. 337)

47*b*. Premaxillary teeth 2-rowed; branched anal rays about 12 to 45.

50*a*.[3] Caudal fin with the scales extending one-fourth or a greater distance out on rays of that fin, these scales usually small.

51*a*. Lateral line complete; anal sheath of scales present, at least anteriorly.

52*a*. Lateral line much decurved in front, not parallel with row of scales below it in front, frequently several odd scales in front between it and the next regular series; depth at least half standard length; preventral area flat with sharply bent scales on sides; profile depressed, over eyes; occipital crest one-third of distance from its base to dorsal; outer series of premaxillary teeth small and of even size, inner row larger, graduated; dentary with larger teeth in front, abruptly minute behind; anal rays 31 to 37.

Tetragonopterus Cuvier (p. 337)

52*b*. Lateral line little decurved, parallel with row of scales below it.

53*a*. Second suborbital leaving a naked area between it and lower limb of preopercle; at least 5 teeth in inner row of premaxillary; outer series of premaxillary teeth in a line parallel with inner series, except for one tooth that frequently retreats a little from in line with others; anal rays 18 to 37.

Moenkhausia Eigenmann (p. 338)

53*b*. Second suborbital in contact with preoperculum below and usually covering cheek; caudal fin base variably scaled or naked; 4 teeth

[3] Sections 50*a* and 50*b* modified after Eigenmann.

in inner row of premaxillary, one tooth on each side in outer row sometimes out of line; anal rays 15 to 43.

Bryconamericus Eigenmann (p. 338)

51*b*. Lateral line incomplete, of 3 to 18 pores; maxillary teeth if present crowded on upper anterior angle; anal sheath of scales short, incomplete; anal rays 12 to 34.

Hemigrammus Gill (p. 348)

50*b*. Caudal fin naked except at its base, scales on middle of lobes of caudal fin never minute and not extending more than one-fourth way out on longest rays.

54*a*. Lateral line incomplete; about 2½ scales bordering on one side of supraoccipital process; sheath of scales on anal base only along anterior half or less; usually 5 teeth in inner row on premaxillary.

Hyphessobrycon Durbin (p. 349)

54*b*. Lateral line complete.

55*a*. Second suborbital not covering cheek and not in contact with preopercle; about 5 teeth in inner row on premaxillary; premaxillary-maxillary borders usually sharp-angled where they meet; usually 4 scales bordering on one side of supraoccipital process; anal rays 18 to 45.

Astyanax Baird and Girard (p. 353)

55*b*. Second suborbital in contact with lower limb of preopercle; usually 4 teeth in inner series of premaxillary; anal rays 15 to 43; 2 to 2½ scales bordering on one side of supraoccipital process; anal sheath of scales along base of anal rays at least anteriorly.

56*a*. None to 6 teeth crowded at anterior upper portion of maxillary.

Bryconamericus Eigenmann (p. 338)

56*b*. Teeth along greater part or along entire edge of maxillary.

Hemibrycon Günther (p. 361)

Genus CURIMATELLA Eigenmann and Eigenmann

Curimatella Eigenmann and Eigenmann, Ann. New York Acad. Sci., vol. 4, p. 7, 1889. (Type, *Curimatella lepidurus* Eigenmann and Eigenmann.)

The following key to the species of *Curimatella* reported from Venezuela was prepared from the literature. A further study of

specimens from the Orinoco may reveal that only one species occurs at Ciudad Bolívar.

1*a*. Scales 32, 5½ above lateral line and 5 to 5½ below it to pelvic bases; caudal base with a large blackish-brown spot.
Curimatella bolivarensis (Steindachner)

1*b*. Scales 35 to 38, 5 or 5½ above and 5 scales below lateral line; no dark caudal spot---------- **Curimatella alburna** (Müller and Troschel)

CURIMATELLA BOLIVARENSIS (Steindachner)

Curimatus bolivarensis Steindachner, Anz. Akad. Wiss. Wien, vol. 47, p. 265, 1910 (Ciudad Bolívar, Venezuela).

CURIMATELLA ALBURNA (Müller and Troschel)

Anodus alburnus Müller and Troschel, Horae ichthyologicae, pts. 1, 2, p. 26, pl. 4, fig. 3, 3a, 1845 (Guiana, Lake Amucu).

Curimatus alburnus Steindachner, Denkschr. Akad. Wiss. Wien, vol. 41, p. 153, 1879 (Ciudad Bolívar).—Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 157, 1899 (Apure River, Venezuela).

Genus CURIMATA Walbaum

Curimata Walbaum, Artedi's Bibliotheca ichthyologica, vol. 3, ed. 2, p. 80, 1792. (Type, *Salmo marcgravii* Walbaum = *Salmo cyprinoides* Linnaeus.) (Ref. copied.)

KEY TO THE SPECIES OF CURIMATA REPORTED FROM VENEZUELA

1*a*. Scale rows from anterior edge of gill opening to midbase of caudal fin 51 to 63; second and third rays of dorsal produced, reaching in extreme cases to caudal; roof of mouth with numerous folds of skin; upper gill arches with papillae and with valvelike folds at anterior ends; lower gill arches with backward- and forward-directed rakerlike filaments on anterior halves, forming a grill on floor of mouth and with a few large papillae on posterior halves---------- **Curimata schomburgkii** Günther

1*b*. Scale rows fewer than 50.

2*a*. Midbase of caudal fin or rear of caudal peduncle with a black spot; anal rays iii, 7 and dorsal ii, 9; scales about 35 or 36, 5½ to 6 above and 4½ to 5½ below lateral line.

3*a*. A roundish black blotch or spot at midbase of caudal fin and extending a little on caudal peduncle; base of dorsal rays without a black blotch; insertion of pelvics equal distance from tip of snout and midcaudal base; depth of body 3; scales below lateral line to pelvic base 4½.
Curimata spilura Günther

3*b*. An oblong blackish blotch or spot on midposterior end of caudal peduncle barely extending on base of rays; an elongate black streak basally on middle dorsal rays; insertion of pelvics closer to tip of snout than to midcaudal base by a distance equal to diameter of eye; depth of body 2½; scales below lateral line to pelvic base 5 to 5½.
Curimata argentea Gill

2*b*. No black blotch at base of caudal fin, scales numbering 39 to 43 from gill opening to midcaudal base, with 6 above and 5 or 6 below lateral line; dorsal rays ii, 9, anal iii, 7, pectoral i, 13 or i, 14; roof of mouth with 5 lengthwise fleshy folds, one along midline enlarged anteriorly, the pair next to midline enlarged posteriorly, and outer pair enlarged anteriorly; rear of mouth at sides below orbit with a patch of dermal papillae; inside of gill cover finely papillate; gill rakers short, pointed, about 19 or 20+30;

a very low keel along midventral line from pelvics to anus; peritoneum dusky to blackish on sides, paler ventrally; body plain darkish above, paler below; in young and half-grown a faint grayish streak occurring along midsides posteriorly------ **Curimata magdalenae** Steindachner

CURIMATA SCHOMBURGKII Günther

Curimatus schomburgkii GÜNTHER, Catalogue of the fishes in the British Museum, vol. 5, p. 291, 1864 (British Guiana).

Curimata schomburgkii FOWLER, Proc. Acad. Nat. Sci. Philadelphia, vol. 83, p. 407, 1931 (Pitch Lake at Guanoco, Venezuela).

CURIMATA SPILURA Günther

Curimatus spilurus GÜNTHER, Catalogue of the fishes in the British Museum, vol. 5, p. 288, 1864 (Essequibo).—STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 41, p. 153, 1879 (Ciudad Bolívar).

Curimata spilura EIGENMANN and ALLEN, Fishes of western South America, p. 292, 1942 (Orinoco).

CURIMATA ARGENTEA Gill

Curimatus argenteus GILL, Ann. Lyc. Nat. Hist. New York, vol. 6, p. 62, 1858 (Trinidad).—EIGENMANN, Indiana Univ. Studies, vol. 7, No. 44, p. 9, 1920 (El Concejo, Río Tiquirito, Maracay, Río Bué, Venezuela).—PEARSE, Univ. Wisconsin Studies, No. 1, p. 21, 1920 (mouth Río Bué, Lago Valencia at Maracay, Venezuela).

Curimata argentea FOWLER, Proc. Acad. Nat. Sci. Philadelphia, vol. 83, p. 407, 1931 (Pitch Lake at Guanoco, Venezuela).

CURIMATA MAGDALENAE Steindachner

BOCACHICA

Curimatus magdalenae STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 39, p. 50, 1878 (Río Magdalena).—MEEK and HILDEBRAND, Publ. Field Mus. Nat. Hist., zool. ser., vol. 10, No. 15, p. 269, 1916 (Lake Maracaibo).—EIGENMANN, Mem. Carnegie Mus., vol. 9, p. 104, pl. 17, fig. 2, 1922 (Encontrados, Estado de Zulia, Maracaibo Basin).

See table 1 for counts made on specimens of *Curimata magdalenae*. Throughout the extensive range of *C. magdalenae* local populations, presumably of subspecific rank, undoubtedly occur, but the significance of these and their naming should await a careful analysis of hundreds of examples from many different stream systems. There are about 19 or 20+30 gill rakers on the first gill arch of the form in the Maracaibo Basin.

The following collections were made by Leonard P. Schultz in the Maracaibo Basin of Venezuela during 1942:

U. S. N. M. No. 121309, 4 specimens, 45 to 92 mm. in standard length, Río Machango at bridge south of Lagunillas, March 16.

U. S. N. M. No. 121312, a specimen 114.5 mm., from the Río San Pedro at the bridge south of Mene Grande, Motatán system, March 20.

U. S. N. M. No. 121308, a specimen 83 mm., from Ciénaga del Guanavana about 10 km. north of Sinamaica, March 11.

U. S. N. M. No. 121310, 14 specimens, 35 to 79 mm., taken in Lago Tulé, about 75 km. west of Maracaibo, Río Socuy drainage, March 1.

U. S. N. M. No. 121314, 2 examples, 104 and 170 mm., obtained in Lake Maracaibo at the mouth of the Río Concha, May 2.

U. S. N. M. No. 121311, 2 specimens, 106 and 109.5 mm., from the Río Palmar near Totuma, about 100 km. southwest of Maracaibo, February 21.

U. S. N. M. No. 121313, 3 examples, 101.5 to 112 mm., from the Río Apón about 35 km. south of Rosario, February 26.

U. S. N. M. No. 121319, 1 specimen, 194 mm., from the Río de Los Pajaros, 3 km. above Lago Maracaibo, April 30.

U. S. N. M. No. 121315, 29 examples, 86.5 to 138 mm., from the Río San Juan near the bridge south of Mene Grande, Motatán system, March 17 and 20.

U. S. N. M. No. 121316, 16 examples, 108 to 147 mm., taken from a caño ¾ km. west of Sinamaica, March 11.

U. S. N. M. No. 121317, 52 specimens, 42.5 to 132 mm., from the Río Negro below mouth of Río Yasa, March 2.

U. S. N. M. No. 121318, 25 specimens, 55 to 150 mm., from the Río Socuy, 3 km. above mouth, February 24.

TABLE 1.—*Counts made on* Curimata magdalenae *from three South American localities*

Locality	Number of fin rays						Number of scales								
	Dorsal	Anal	Pelvic		Pectoral		Rows crossing lateral line						Above	Below	
	ii, 9	iii, 7	i, 7	i, 8	i, 13	i, 14	39	40	41	42	43	44	6	5	6
Truando, Colombia	3	3	------	3	------	6	2	1	----	----	----	----	3	3	----
Calamar, Colombia	3	3	------	3	6	------	----	1	1	----	1	----	3	2	1
Maracaibo Basin, Venezuela	6	6	1	6	1	8	----	----	1	5	1	----	6	----	6

Three specimens, F.M.N.H. Nos. 41992–41994, from Lago Maracaibo, W. H. Osgood, 1911, were lent to me for report by the Chicago Natural History Museum.

In specimens about 80 to 100 mm. and sometimes smaller, the midsides of the body have a darkish band posteriorly, with a pale streak running along the lateral line in the middle of this band; in larger specimens the sides are plain in color.

This species is used extensively as food, as it is one of the better flavored fishes in the Maracaibo Basin.

Genus ANODUS Agassiz

Anodus AGASSIZ, *in* Spix, Selecta genera et species piscium . . . Brasiliam . . ., p. 57, pl. 40, 1829. (Type, *Anodus elongatus* Agassiz.) (Ref. copied.)

ANODUS LATICEPS (Valenciennes)

BOCACHICA

Curimatus laticeps VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 22, p. 21, pl. 634, 1849 (Lago Maracaibo).—GÜNTHER, Catalogue

of the fishes in the British Museum, vol. 5, p. 293, 1864 (Lago Maracaibo).—Steindachner, Denkschr. Akad. Wiss. Wien, vol. 43, p. 137, 1882 (Lagoon of Maracaibo).—Eigenmann and Eigenmann, Ann. New York Acad. Sci., vol. 4, p. 24, 1889 (Lago Maracaibo).

Anodus laticeps Eigenmann and Allen, Fishes of western South America, p. 300, 1942 (Lago Maracaibo).

See table 2 for certain counts made on this species from the Maracaibo Basin.

The following collections were made by Leonard P. Schultz during 1942, in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121321, 3 specimens, 149 to 152 mm., taken in the Río Negro below mouth of Río Yasa, March 2.

U.S.N.M. 121323, 4 specimens, 128 to 159 mm., from the Río Palmar at the bridge, 70 km. southwest of Maracaibo, March 6.

U.S.N.M. No. 121322, specimen, 130 mm., from pool in Río San Ignacio, 20 km. south of Rosario, February 26.

U.S.N.M. No. 121320, 9 specimens, 207 to 255 mm., from the Río Apón about 35 km. south of Rosario, February 26.

Table 2.—*Counts made on* Anodus laticeps *from the Maracaibo Basin*

Number of fin rays								Number of scales in reference to lateral line										
Dorsal	Anal		Pectoral			Pelvic		Rows from gill opening to mid-caudal base						Above		Below		
ii, 9	ii, 13	ii, 14	i, 15	i, 16	i, 17	i, 8	i, 9	113	114	115	116	117	118	26	27	25	26	27
6	3	4	2	7	1	5	6	1	-----	1	1	1	1	4	1	1	2	1

Subfamily Serrasalminae

KEY[4] TO THE GENERA AND SPECIES OF SERRASALMINAE REPORTED FROM VENEZUELA[5]

1*a*. Teeth in a single series in both jaws; teeth with a strong median cusp and with either a single lateral cusp or a pair, those of upper jaw mostly asymmetrical (*Serrasalmus*).

2*a*. Head broad, with upper profile straight or convex; length 2⅔ to 3 in total length (without caudal); snout short, blunt; second suborbital deeper than eye, covering or nearly covering cheek; interorbital width 1⅓ to 2¼ in length of head; lower jaw very heavy; palatines toothless; distance between rayed dorsal and adipose fin 2 to 3½ in base of former; adipose fin not rayed; fewer than 40 ventral serrae; base of rayed dorsal equal to or greater than distance from upper caudal fulcra; anterior profile only moderately arched; base of rayed dorsal 2⅓ to 2⅔ in depth of body, 2 to 2⅔ times distance from adipose fin------**Serrasalmus nattereri** (Kner)

2*b*. Head narrower, with upper profile more or less concave above eyes; length 2⅝ to 3¼ in total length (without caudal); lower jaw not very heavy;

[4] Modified after Norman's review of this subfamily in Proc. Zool. Soc. London for 1928, pp. 781–829, pl. 1, figs. 1–20, 1928.

[5] *Pygocentrus palometa* Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 22, p. 296, 1849 (Río Apure, Río Guarico), is not recognizable at present from his description.

interorbital width 2⅓ to 3⅓ in length of head; palatines with or without teeth; distance between rayed dorsal and adipose fin 1 to 1⅔ in base of former.

3*a*. Palate toothless, sometimes roughened or with a few blunt, rudimentary teeth; second suborbital not or not much deeper than eye, separated from angle of preoperculum by a space equal to ⅓ to ½ diameter of eye; base of adipose fin 3⅔ to 4¼ in that of rayed dorsal, which is 3⅓ to 3½ in depth of body; distance between rayed dorsal and adipose about equal to base of former.

4*a*. Depth about 1⅔ in standard length, head about 3⅓; eye 3⅔ to 3¾ in head; origin of dorsal a little nearer base of caudal than end of snout.
Serrasalmus scapularis Günther

4*b*. Depth about 1⅗ in the length, head 3⅔ to 3½; eye about 4 in head; origin of dorsal equidistant from end of snout and base of caudal.
Serrasalmus serrulatus (Valenciennes)

3*b*. Palate with well-developed teeth.

5*a*. Second suborbital broad, narrowly separated from preoperculum in adults.

6*a*. Dorsal with 14 to 19 rays; anal 32 to 37 rays; snout shorter than eye in adults; base of adipose fin 2¾ to 4 in that of rayed dorsal; snout blunt; interorbital width 2⅓ to 2⅔ in length of head; last simple ray of anal distinctly thicker than first branched ray; caudal fin generally with a black submarginal band.
Serrasalmus spilopleura Kner

6*b*. Dorsal with 20 rays; anal with 27 rays.
Serrasalmus caribe Valenciennes

5*b*. Second suborbital rather narrow, separated from angle of preopercle by a space equal to about ½ (or more in young) of eye; depth 1¾ in length; head 3; base of anal 2¾ in length to base of caudal fin; dorsal rays ii, 14 or 15; anal rays iii, 29 to 31; ventral serrae 22 to 24+10 or 11; base of caudal fin blackish.. **Serrasalmus eigenmanni** Norman

1*b*. Premaxillary teeth in two series; mandibulary teeth in a single series; sometimes a pair of conical teeth behind and in contact with symphyseal mandibulary teeth; abdomen serrated before and behind pelvics; teeth more or less close-set, either incisorlike or with an oblique cutting edge or molariform; each premaxillary with 5 teeth in outer and 2 in inner series; jaws equal or lower, a little projecting; conical mandibulary teeth present.

7*a*. No predorsal spine.

8*a*. Supplementary scales, if present, small and confined to hinder edges of primary scales; anal fin with a basal sheath of scales and with highest rays anteriorly (*Colossoma*); gill rakers 15 to 18 on lower half of first arch; 65 to 69 ventral serrae; base of adipose fin 5 to 6¼ in that of rayed dorsal, base of dorsal 4⅘ to 5⅚ in standard length; adipose fin rayed in adults.

9*a*. Head a little more than 3 in standard length in adults; breadth of operculum more than one-half length of postorbital part of head; suborbital and opercular bones rather smooth; second suborbital almost entirely covering cheek; about 80 scales from head to caudal base.. **Colossoma macropomus** (Cuvier)

9*b*. Head 3⅓ to nearly 4 in standard length in adults; breadth of operculum less than one-half length of postorbital part of head; suborbital and opercular bones rugose; second suborbital separated from

angle of preoperculum by a wide naked space; depth about 2 to 2¾ in total length; origin of dorsal nearer end of snout than base of caudal, slightly behind origin of pelvics; probably about 95 to 110 scales from head to caudal base---------- **Colossoma brachypomus** (Cuvier)

8*b*. Numerous supplementary scales, which may obscure primary ones; anal fin densely scaled in at least its basal half and with highest rays posteriorly or of nearly equal length posteriorly and anteriorly (*Mylossoma*).

10*a*. Length of anal base 2½ to 3⅓ times in standard length; ventral serrae 10 to 13 along midventral line behind base of pelvics then 7 to 10 pairs around vent; branched dorsal rays 14 to 16 and anal with 33 to 36; base of adipose fin 3½ to 6 in that of dorsal.

Mylossoma acanthogaster (Valenciennes)

10*b*. Length of anal base 1⅞ to 2¼ in standard length.

11*a*. Ventral serrae 10 to 15 behind root of pelvic fin; a space equal to about one-fourth diameter of eye between last spine and first anal ray; dorsal with 14 to 16 branched rays, anal with 28 to 34; base of adipose fin 3¾ to 4¼ in that of rayed dorsal.

Mylossoma aureum (Agassiz)

11*b*. Ventral serrae 18 to 22 behind root of pelvic; last spine very close to first ray of anal; dorsal with 14 or 15 branched rays and anal with 34 to 38; base of adipose fin 2⅝ to 2⅞ in that of rayed dorsal.

Mylossoma duriventris (Cuvier)

7*b*. A predorsal spine present; base of adipose fin less than half as long as that of rayed dorsal; dorsal with 22 rays or more; anterior teeth of outer series of premaxillary with an oblique cutting edge, not greatly compressed, generally more or less separated from those of inner series (*Myloplus*).

12*a*. Sides of body with more or less distinct round orange spots; margins of anterior part of anal dusky; ventral serrae 28 + 10; dorsal iii or iv, 24 to 28, anal iii or iv, 34 to 37.

Myloplus asterias (Müller and Troschel)

12*b*. A black vertical bar or blotch on side of body between dorsal and pelvic fins; anal 23 to 25---------- **Myloplus schomburgkii** (Jardine)

Genus SERRASALMUS Lacepède

Serrasalmus Lacepède, Histoire naturelle des poissons, vol. 5, p. 283, 1803. (Type, *Salmo rhombeus* Linnaeus.)

SERRASALMUS NATTERERI (Kner)

Caribe

Pygocentrus nattereri Kner, Denkschr. Akad. Wiss. Wien, vol. 18, p. 36, pl. 3, fig. 8, 1859.

Serrasalmo nattereri Peters, Monatsb. Akad. Wiss. Berlin, 1877, p. 472 (San Fernando de Apure, Venezuela).—Röhl, Fauna descriptiva de Venezuela, p. 377, fig. 190, 1942 (Orinoco).

Serrasalmo (*Pygocentrus*) *notatus* Lütken, Vid. Medd. Naturh. Foren. Kjøbenhavn, 1874, pts. 12–16, p. 238 (Caracas, Venezuela).

Pygocentrus notatus Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 60, 1891 (Venezuela).

Pygocentrus stigmaterythraeus Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 63, p. 424, 1911 (La Pedrita on Caño Uracoa, Venezuela).

Rooseveltiella stigmaterythraeus Eigenmann, Ann. Carnegie Mus., vol. 9, p. 245, 1915 (La Pedrita on Caño Uracoa).

SERRASALMUS SCAPULARIS Günther

Serrasalmo scapularis Günther, Catalogue of the fishes in the British Museum, vol. 5, p. 368, 1864.—? Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 157, 1899 (Apure River, Venezuela).

Serrasalmus scapularis Norman, Proc. Zool. Soc. London, 1928, pt. 4, p. 792, fig. 8 (Venezuela ? [based on Pellegrin]).

Serrasalmus coccogenis Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 63, p. 428, 1911 (La Pedrita on Caño Uracoa, Venezuela).

SERRASALMUS SERRULATUS (Valenciennes)

Caribe

Pygopristis serrulatus Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 22, p. 300, 1849.

Serrasalmo gymnogenys Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 157, 1899 (Apure River drainage).

SERRASALMUS SPILOPLEURA Kner

Caribe

Serrasalmo spilopleura Kner, Denkschr. Akad. Wiss. Wien, vol. 18, p. 43, pl. 5, fig. 11, 1859.

Serrasalmo irritans Peters, Monatsb. Akad. Wiss. Berlin, 1877, p. 472 (San Fernando de Apure, Venezuela).

Serrasalmus irritans Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 60, 1891 (Apure).

SERRASALMUS CARIBE Valenciennes

Caribe

Serrasalmus caribe Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 22, p. 278, 1849 (Río Orinoco, Río Apure, Llanos de Venezuela).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 60, 1891 (Orinoco).—Norman, Proc. Zool. Soc. London, 1928, pt. 4, p. 803 (Río Orinoco).

SERRASALMUS EIGENMANNI Norman

Serrasalmus eigenmanni Norman, Proc. Zool. Soc. London, 1928, pt. 4, p. 804, fig. 16 (Rockstone, British Guiana).

Two specimens, 32 and 33 mm., collected by Dr. William Beebe at Río Caripe, April 23, 1942, were lent to me for identification and report.

Genus COLOSSOMA Eigenmann

Colossoma Eigenmann, Smithsonian Misc. Coll., vol. 45, p. 148, 1903.—Eigenmann and Kennedy, Proc. Acad. Nat. Sci. Philadelphia, vol. 55, p. 530, 1903. (Type, *Myletes oculus* Cope.)

COLOSSOMA MACROPOMUS (Cuvier)

Myletes macropomus Cuvier, Mem. Mus. Hist. Nat. Paris, vol. 4, p. 453, pl. 21, fig. 3, 1818.—Peters, Monatsb. Akad. Wiss. Berlin, 1877, p. 473 (Apure River, Venezuela).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 61, 1891 (Apure).

COLOSSOMA BRACHYPOMUS (Cuvier)

Myeletes brachypomus Cuvier, Mem. Mus. Hist. Nat. Paris, vol. 4, p. 452, pl. 22, fig. 1, 1818.

? *Piarctus* (type: *Myeletes brachypomus*) EIGENMANN and ALLEN, Fishes of western South America, p. 247, 1942 (Orinoco Basin to La Plata Basin).

A specimen collected by Dr. William Beebe in the Río Caripe, near Caripito, Venezuela, April 23, 1943, was lent to me for study. I identify it with some uncertainty as *Colossoma brachypomus* because Cuvier (Mem. Mus. Hist. Nat. Paris, vol. 4, p. 452, pl. 22, fig. 1, 1818) and Valenciennes (Histoire naturelle des poissons, vol. 22, p. 199, 1849) do not describe certain characters. This much is certain: It is very close to *macropomus* but disagrees because the second suborbital does not completely cover the cheek. It agrees with *brachypomus* in this respect and for this reason I tentatively identify it as *brachypomus*, but in the event it is a new form, the following description is recorded:

Standard length 185 mm. Greatest depth 1.9, head 3.2, anal fin base 3.7, dorsal fin base 4.8, and greatest postorbital length of head 5.3, all in standard length; adipose base 5 times in dorsal fin base; eye 4 in the head, 2.3 in interorbital space; dorsal profile of head a little concave, snout short, blunt; suborbital and postorbital bones with low ridges; the second suborbital does not cover the cheek by a naked space whose width is about equal to pupil; distance from rear of dorsal fin base to rear of adipose fin base not quite equal to length of dorsal fin base; pelvic fins inserted in advance of a vertical line through dorsal origin; anterior rays of anal longest; the distal margin of anal fin a little concave; longest anal ray (first branched) a little longer than dorsal fin base; origin of dorsal fin a little closer to midcaudal fin base than to tip of snout; adipose fin not rayed.

The following counts were made: Dorsal rays iii, 14; anal iii, 24; gill rakers on first gill arch 18+18; ventral serrae 38 to pelvics +21 to anus +6 paired ones around anus; pectoral fin rays i, 16–i, 16; pelvic rays i, 7–i, 7; branched caudal rays 17; 10 or 11 scales from rear base of adipose fin to lateral line; scales from pelvic insertions to lateral line 23; number of scales from upper edge of gill opening to midbase of caudal fin 95; basal ¼ of anal fin rays covered with small scales as is base of caudal fin.

Genus MYLOSSOMA Eigenmann and Kennedy

Mylossoma EIGENMANN and KENNEDY, Proc. Acad. Nat. Sci. Philadelphia, vol. 55, p. 530, Sept. 28, 1903 (type, *Myletes albiscopus* Cope).—EIGENMANN, Smithsonian Misc. Coll., vol. 45, p. 148, Dec. 9, 1903 (type, *M. albiscopus* Cope).

MYLOSSOMA ACANTHOGASTER (Valenciennes)

PAMPANO

Myletes acanthogaster VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 22, p. 209, 1849 (Lagoon of Maracaibo).—EIGENMANN and EIGENMANN, Proc. U. S. Nat. Mus., vol. 14, p. 60, 1891 (Lago Maracaibo).

Mylossoma acanthogaster NORMAN, Proc. Zool. Soc. London, 1928, pt. 4, p. 812 (Maracaibo Lagoon, Venezuela).

The following collections were made by Leonard P. Schultz in the Maracaibo Basin of Venezuela during 1942:

U.S.N.M. No. 121347, 12 examples, 154 to 294 mm. in standard length, from the Río Apón about 35 km. south of Rosario, February 26.

U.S.N.M. No. 121348, 5 specimens, 104 to 216 mm., Río Palmar at bridge 70 km. southwest of Maracaibo, March 6.

The shape of this species changes remarkably with increase in size, the body becoming more elongate. The relative positions of the insertion of pelvics and origin of dorsal fins are variable. These differences are recorded in table 4. The average length of the anal base and the average of the greatest depths of the body for the following standard lengths were computed as shown in table 3.

TABLE 3.—*Variation in* Mylossoma acanthogaster

Standard lengths (in mm.)	Average length of anal base	Average greatest depth of body	Number of specimens
100–124	40.4	69.2	1
125–149	38.1	65.0	1
150–174	35.5	59.2	3
175–199	36.1	54.5	6
200–224	34.7	56.2	2
225–249	35.2	57.8	2
250–274	32.8	53.1	1
275–299	32.6	52.4	1

TABLE 4.—*Measurements, expressed in hundredths of the standard length, made on* Mylossoma acanthogaster

Standard length (in mm.)	104	134	154	163	164	177	178	179	182	195	198	201	216	235	237	256	294
Length of anal base	40.4	38.1	35.7	35.0	35.9	36.1	37.1	35.8	35.7	35.4	36.3	39.8	29.6	34.9	35.5	32.8	32.6
Greatest depth	69.2	65.0	59.0	61.4	57.3	52.5	57.2	58.0	53.8	51.2	54.5	60.2	52.3	58.2	57.4	53.1	52.4
Snout to pelvic insertion	53.8	56.7	54.5	57.6	54.2	52.5	51.0	54.2	52.8	52.8	51.0	49.8	53.7	52.3	52.3	50.0	50.3
Snout to dorsal origin	59.6	59.7	56.5	57.0	56.0	54.2	57.2	56.4	58.2	52.3	56.0	58.7	52.8	57.8	56.5	57.8	58.1

TABLE 5.—*Counts made on* Mylossoma acanthogaster

Number of fin rays											Number of gill rakers on first gill arch					
Dorsal			Anal				Pectoral					Above angle		At angle	Below angle		
iii, 14	iii, 15	iii, 16	iii, 33	iii, 34	iii, 35	iii, 36	i, 14	i, 15	i, 16	i, 17	i, 18	15	16	1	20	21	22
7	1	1	3	2	3	1	1	3	3	-----	3	3	1	4	1	2	1

The following coloration of *acanthogaster* was recorded from live specimens: Plain in color, silvery on sides, darker above and paler below; anal fin brilliant crimson; upper parts of eyes red.

The pampanos frequent the deeper pools of the rivers, and are active fishes. They are used extensively as food and occur occasionally in the Maracaibo market.

MYLOSSOMA AUREUM (Agassiz)

Myletes aureus Agassiz, *in* Spix, Selecta genera et species piscium . . . Brasiliam . . ., p. 74, 1829.

Mylossoma aureum Eigenmann and Allen, Fishes of western South America, p. 249, 1942 (Orinoco to Ucayali and La Plata).

MYLOSSOMA DURIVENTRIS (Cuvier)

Myletes duriventris Cuvier, Mem. Mus. Hist. Paris, vol. 4, p. 451, pl. 22, fig. 2, 1818.—?Peters, Monatsb. Akad. Wiss. Berlin, 1877, p. 473 (Calabozo, Venezuela).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 61, 1891 (Calabozo).

Mylossoma duriventre Eigenmann and Allen, Fishes of western South America, p. 249, 1942 (Orinoco, upper Amazon, La Plata systems).

Genus MYLOPLUS Gill

Myloplus Gill, Proc. U. S. Nat. Mus., vol. 18, p. 214, 1896. (Type, *Myletes asterias* Müller and Troschel.)

MYLOPLUS ASTERIAS (Müller and Troschel)

Myletes asterias Müller and Troschel, Horae ichthyologicae, pt. 1, pp. 24, 36, pl. 10, fig. 2, 1845.

? *Myloplus* (type: *Myletes asterias* Müller and Troschel) Eigenmann and Allen, Fishes of western South America, p. 251, 1942 (Orinoco and Guianas to Amazons and Paraguay).

MYLOPLUS SCHOMBURGKII (Jardine)

Tetragonopterus schomburgkii Jardine, *in* Schomburgk, The natural history of the fishes of [British] Guiana, vol. 1, p. 243, pl. 22, 1841 (ref. copied).

Myletes palomet Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 22, p. 214, 1849 (upper Orinoco).—Röhl, Fauna descriptiva de Venezuela, p. 384, 1942 (Río Apure).

Subfamily Ctenolucinae

Genus CTENOLUCIUS Gill

Ctenolucius Gill, Proc. Acad. Nat. Sci. Philadelphia, Suppl., vol. 13, p. 8, 1861. [Type, based on U. S. N. M. No. 1658 by Gill from Río Truando, Colombia= *Belonocharax beani* Fowler=*Ctenolucius hujeta beani* (Fowler).]

Luciocharax Steindachner, Denkschr. Akad. Wiss. Wien, vol. 39, p. 67, pl. 13, fig. 2, a–b, 1878. (Type, *Luciocharax insculptus* Steindachner, Río Magdalena.)

Belonocharax Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 62, p. 464, fig. 51, 1906. (Type, *Belonocharax beani* Fowler, Truando.)

This group of fishes has been reported upon under at least two subfamily names from time to time. Eigenmann (Repts. Princeton Univ. Exped. Patagonia, vol. 3, pt. 4, p. 446, 1910; Mem. Carnegie Mus.,

vol. 5, p. 411, 1912, and vol. 9, p. 166, 1922) reported upon them under the subfamily name "Hydrocyninae," but that name is not available because *Hydrocynus* Cuvier (Règne animal, vol. 2, p. 167, 1817) was restricted by Cuvier (Mem. Mus. Hist. Nat. Paris, vol. 5, p. 353, 1819) to the African *H. forskali* and spelled *Hydrocyon*. The name *Hydrocynus*, therefore, is not available for any American genus of Characinidae.

The family name Xiphostomidae was used by Regan (Ann. Mag. Nat. Hist., ser. 8, vol. 8, p. 13, 1911) and the subfamily name Xiphostominae by Eigenmann and Allen (Fishes of western South America, p. 274, 1942), but both of these names are not available for fishes.

Gregory and Conrad (Zoologica, vol. 23, pt. 4, p. 338, 1938) refer *Luciocharax* to the subfamily Sarcodacinae. It so happens that *Sarcodaces* Günther, 1864, is not so old a name as *Ctenolucius* Gill, 1861, and thus is not available as the basis of the subfamily name in this group, even though Gregory and Conrad may be correct in referring that African genus to the same subfamily as *Ctenolucius* and *Boulengerella*. No doubt Ctenolucinae is the name that should be used for this group of genera.

It should be added that Cuvier's figure of *Hydrocyon lucius* (Mem. Mus. Nat. Hist. Paris, vol. 5, pl. 1, fig. 3, 1819) shows the jaws the same as in *Ctenolucius*, but the dorsal fin is farther forward than in the genotype.

The forms of *Ctenolucius* in northern South America in the Maracaibo and Magdalena Basins and in the Pacific slope of Panama and Colombia are very closely related, and it is difficult, if not impossible, to separate them on one or two specimens. The males may have a few more pores in the lateral line than the females, but this point needs careful study before a final conclusion can be made. At most, the various species named cannot be more than poorly separated subspecies.

See table 6 for counts made on species of *Ctenolucius* from northern South America.

KEY TO THE SUBSPECIES OF CTENOLUCIUS HUJETA

1*a*. Scales 45 to 49; scales in a transverse row from dorsal to anus usually 11; scales around caudal peduncle in a zigzag row 16 to 19; pores in lateral line 24 to 31; upper sides of body with more or less evident brown wavy lines between rows of scales (Maracaibo Basin).

Ctenolucius hujeta hujeta (Valenciennes)

1*b*. Scales 42 to 48; scales in a transverse row from dorsal to anus usually 11; scales around caudal peduncle 16 or 17; pores in lateral line 22 to 26; practically no trace of brown wavy lines along upper sides (Magdalena System).

Ctenolucius hujeta insculptus (Steindachner)

1*c*. Scales 49 or 50; scales in a transverse row from dorsal to anus usually 11; scales around caudal peduncle 16 or 17; pores in lateral line 25 to 36; upper sides of body with very distinct, lengthwise, brown wavy streaks between rows of scales (Pacific slope of Panama and of Colombia).

Ctenolucius hujeta beani (Fowler)

TABLE 6.—*Counts made on subspecies of* Ctenolucius hujeta.

Subspecies	Number of fin rays								Number of pores in lateral line																	
	Dorsal	Anal		Pelvic	Pectoral				22	23	24	25	26	27	28	29	30	31	32	33	34	35	36			
	ii, 8	iii, 7	iii, 8	i, 7	i, 17	i, 18	i, 19	i, 20																		
hujeta	7		7	10	2	5	6	1			1	2	3	4	2	1		1								
insculptus	4	1	3	8	4	2	2		1		1	1	1													
beani	4		4	8	2	1	5					1	1		1	2		1								1

Subspecies	Number of scale rows from anterior end of gill opening to midbase of caudal fin									Scales in a transverse row from dorsal origin to anus	Number of scales										
											Before dorsal fin							Around caudal peduncle			
	42	43	44	45	46	47	48	49	50	11	30	31	32	33	34	35	36	16	17	18	19
hujeta				1	6	4	2	2		5		2	1	2	1			3	1	2	1
insculptus	1		2	10	8	6	2			4	1		2		1			3	1		
beani					1	1	1	3	1	4		1		1		1	2	3	1		

CTENOLUCIUS HUJETA HUJETA (Valenciennes)

HUJETA

Xiphostoma hujeta VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 22, p. 358, 1849 (rivers of Maracaibo).—GÜNTHER, Catalogue of fishes in the British Museum, vol. 5, p. 358, 1864 (Maracaibo).—EIGENMANN and EIGENMANN, Proc. U. S. Nat. Mus., vol. 14, p. 59, 1891 (Maracaibo).

Ctenolucius hujeta MYERS, Stanford Ichth. Bull., vol. 2, No. 4, p. 94, 1942 (Quebrada Sargento, tributary of Río Limón, north of Maracaibo).

The following collections were made by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121345, 8 specimens, 98 to 206 mm. in standard length, caño half a mile west of Sinamaica, March 11.

U.S.N.M. No. 121335, 4 specimens, 37 to 205 mm., from Río Machango, 20 km. above bridge south of Lagunillas, March 21.

U.S.N.M. No. 121334, 9 examples, 124 to 156 mm., from Río San Pedro near bridge, Motatán system, March 20.

U.S.N.M. No. 121344, 10 examples, 98 to 228 mm., from Río Socuy, 3 km. above mouth, February 24.

U.S.N.M. No. 121336, 7 specimens, 121 to 165 mm., from Río Negro below mouth of Río Yasa, March 2.

U.S.N.M. No. 121342, a specimen, 106 mm., from Ciénaga del Guanavana about 10 km. north of Sinamaica, March 11.

U.S.N.M. No. 121341, 3 specimens, 118 to 159 mm., from the Río Machango at the bridge south of Lagunillas, March 16.

U.S.N.M. No. 121339, 6 examples, 148 to 187 mm., from the Río Apón about 35 km. south of Rosario, February 26.

U.S.N.M. No. 121340, a specimen, 214 mm., from Río Palmar at bridge, 70 km. southwest of Maracaibo, March 6.

U.S.N.M. No. 121343, 10 examples, 145 to 185 mm., from the Río San Juan near bridge, Motatán system, March 20.

U.S.N.M. No. 121338, 2 examples, 116 and 230 mm., from Lago Tulé, about 80 km. west of Maracaibo, March 1.

U.S.N.M. No. 121337, a specimen, 237 mm., from the Río Palmar near Totuma, about 100 km. southwest of Maracaibo, February 21.

One specimen listed above, U.S.N.M. No. 121335, at 37 mm. in standard length, has a black lateral band, not extending on caudal fin.

After comparing this species with specimens of *Luciocharax insculptus* Steindachner (new genus and new species) from the Magdalena Basin, it was concluded that Myers (*ibid.*, p. 94, 1942) was fully justified in considering Steindachner's species as a synonym of *C. hujeta* Valenciennes.

Genus BOULENGERELLA Eigenmann

Xiphostoma Agassiz, *in* Spix, Selecta genera et species piscium . . . Brasiliam . . ., pp. 60, 78, 1829. (Type, *Xiphostoma cuvieri* Agassiz, designated by Jordan and Evermann, Genera of Fishes, p. 132, 1917.) (Preoccupied by *Xiphostoma* Kirby and Spence, 1828, in Hemiptera.)

Boulengerella Eigenmann, Smithsonian Misc. Coll., vol. 45, p. 147, 1903. (Type, *Xiphostoma lateristriga* Boulenger.)

BOULENGERELLA CUVIERI (Agassiz)

Xiphostoma cuvieri Agassiz, *in* Spix, Selecta genera et species piscium . . . Brasiliam . . ., p. 78, pl. 42, 1829 (ref. copied).—Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 157, 1899 (Apure River, Venezuela).

Genus PROCHILODUS Agassiz

Prochilodus Agassiz, *in* Spix, Selecta genera et species piscium . . . Brasiliam . . ., p. 57, 1829. (Type, *Prochilodus argenteus* Agassiz.) (Ref. copied.)

KEY TO THE SPECIES OF PROCHILODUS REPORTED FROM VENEZUELA[6]

1*a*. Scale rows from upper end of gill opening to midbase of caudal fin 42 to 47; dorsal fin barred with small dark spots but caudal fin plain in color.

2*a*. Branched rays of dorsal 9; anal rays iii, 8, rarely iii, 9; scales 42 or 43; scales above lateral line usually 8, seldom 9; scales below lateral line 6 or 7 (Maracaibo Basin) . . **Prochilodus reticulatus reticulatus** Valenciennes

2*b*. Branched rays of dorsal 10; anal rays iii, 8 or iii, 9; scales 43 or 44; scales above lateral line 7 or 8; scales below lateral line "8 or 9" (Caracas, Venezuela) . . . . . **Prochilodus reticulatus asper** Lütken

2*c*. Branched rays of dorsal 9 or 10, usually 9; anal rays iii, 7 or iii, 8, usually iii, 8; scales 44 to 47, usually 45 or 46; scales above lateral line 8 or 9; scales below lateral line 6 or 7.

Prochilodus reticulatus magdalenae Steindachner[7]

[6] The descriptions of the species of *Prochilodus* reported from the Orinoco system and from Caracas are not adequate. Since no specimens are available to me from those localities, the data used in this key have been taken from the descriptions. Further information is needed to clarify the species already named in the Orinoco Basin.

[7] *Prochilodus reticulatus magdalenae* Steindachner, Denkschr. Akad. Wiss. Wien, vol. 39, p. 78, pl. 12, fig. 1, 1a, 1878 (Río Magdalena) (description on p. 51 of this species leaves off the name *magdalenae*, but the latter is used in the legend for the plate).

1*b*. Scales in lateral line about 53, 10 or 11 above and 10 below to base of pelvics; dorsal rays ii, 9; anal iii, 9; pelvic 10 [?, i, 9] (Orinoco Basin).
Prochilodus laticeps Steindachner

PROCHILODUS RETICULATUS RETICULATUS Valenciennes

BOCACHICA

Prochilodus reticulatus VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 22, p. 92, 1849 (Lago Maracaibo).—GÜNTHER, Catalogue of the fishes in the British Museum, vol. 5, p. 295, 1864 (Lago Maracaibo).

The following specimens were collected by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121324, 31 examples, 125 to 325 mm. in standard length, from the Río Palmar about 100 km. southwest of Maracaibo, near Totuma, February 21.

U.S.N.M. No. 121326, 4 examples, 106 to 113 mm., from a pool of the Río San Ignacio about 20 km. south of Rosario, February 26.

U.S.N.M. No. 121333, 10 specimens, 106 to 224 mm., from the Río Negro below the mouth of the Río Yasa, March 2.

U.S.N.M. No. 121330, 2 specimens, 131 and 158 mm., from Lago Tulé, about 75 km. west of Maracaibo, March 1.

U.S.N.M. No. 121329, 2 examples, 203 and 215 mm., from a caño ¾ km. west of Sinamaica, March 11.

U.S.N.M. No. 121331, 6 examples, 195 to 345 mm., from the Río Apón about 35 km. south of Rosario, February 26.

U.S.N.M. No. 121327, a specimen, 176 mm., from the Río Motatán at the bridge, 22 km. north of Motatán, March 17.

U.S.N.M. No. 121328, 9 examples, 64 to 303 mm., from the Río Socuy, 3 km. above mouth, February 24.

U.S.N.M. No. 121322, an example, 200 mm., from the Río Jimelles, 12 km. east of Motatán, Motatán system, March 24.

This species of bocachica reaches the largest size among the three forms occurring in the Maracaibo Basin.

Since this species has never been adequately described or recognized, a description was drawn up: Detailed measurements were made on two specimens, and these data, expressed in hundredths of the standard length, are recorded below, respectively. Standard length in mm. 177 and 113.

Length of head 31.6 and 31.0; length of snout 13.6 and 11.1; distance between fleshy eyelids along horizontal axis 5.20 and 6.64; diameter of orbit 6.78 and 8.14; interorbital space 15.3 and 16.3; postorbital length of head 14.7 and 13.7; least depth of caudal peduncle 12.3 and 12.4; length of caudal peduncle 13.6 and 15.0; distance from eye to nostrils 3.11 and 3.19; snout to dorsal origin 49.2 and 47.8; snout to anal origin 78.5 and 77.2; snout to adipose origin 84.0 and 87.2; snout to pelvic insertion 53.4 and 50.4; snout to pectoral fin 28.3 and 29.3; snout to anus 76.2 and 75.2; length of base of anal fin 12.2 and 12.4; length of dorsal base 17.2 and 19.9; length of longest ray of dorsal fin 23.7 and 28.7; length of longest anal ray 16.7 and

21.0; length of longest pectoral ray 20.9 and 22.2; length of longest pelvic ray 18.6 and 23.8; length of longest caudal fin ray 28.8 and 33.2; length of shortest caudal fin ray 10.7 and 14.2.

The following counts were made, respectively: Dorsal fin rays ii, 9 and ii, 9; anal iii, 8 and iii, 8; pectoral i, 15-i, 15 and i, 14-i, 14; pelvic i, 8-i, 8 and i, 8-i, 8; branched caudal fin rays 9+8=17 and 9+8=17; number of scale rows crossing lateral line from upper end of gill opening to base of midcaudal fin rays 43 and 43; scales from dorsal origin to lateral line 9 and 8; scales from anal origin to lateral line upward and a little forward 7 and 6; scale rows before dorsal fin 16 and 14; scale rows from dorsal base to adipose origin 13 and 13; scales around caudal peduncle in a zigzag row 18 and 18. For additional counts see table 7.

TABLE 7.—*Counts made on subspecies of* Prochilodus reticulatus

Subspecies	Number of fin rays											Number of scales										
	Dorsal		Anal			Pelvic	Pectoral					Rows crossing lateral line						Above lateral line			Below lateral line	
	ii, 9	ii, 10	iii, 7	iii, 8	iii, 9	i, 8	i, 13	i, 14	i, 15	i, 16	i, 17	42	43	44	45	46	47	7	8	9	6	7
magdalenae	7	2	1	8	----	8	----	4	13	7	2	---	---	1	11	2	1	---	3	4	3	4
reticulatus	12	----	----	11	1	11	1	11	7	2	----	3	9	---	---	---	---	---	7	1	5	2
asper	----	1	----	1	1	1	----	1	1	----	----	---	1	1	---	---	---	11	---	---	---	---

Body compressed, head rounded, profile a little concave at occiput; mouth somewhat protrusible, but premaxillary not strictly protractile, mouth more or less disklike; lips with very numerous small, incisorlike teeth; inside of the outer series of teeth near middle of mouth on upper and lower surfaces of mouth another short series of small incisorlike teeth arranged in a curve, the two curved series meeting posteriorly, this lower series on each side numbering about 10 or 11 and the upper about 18; nasal openings together, the pair not separated by the skin of the head; lower lip with wide frenum; caudal and all other fins without scales except at their bases; gill membranes joined to the isthmus with a narrow free fold; scales rough or ctenoid, more so anteriorly; a low keel from pelvic bases to anus along midventral line; belly rounded to pelvic insertion; lateral line complete; pelvics inserted under fifth to sixth branched dorsal fin rays; anal origin a little in advance of adipose origin; margin of dorsal rounded, the first or second branched dorsal ray longest; anal margin concave, the first branched ray longest and when fin is depressed the first rays of anal extending a little past the last rays; posterior margin of paired fins truncate, then rounded; caudal fin deeply forked, upper lobe a

little longer and more pointed than lower lobe, the latter on adults sometimes a little rounded; pectoral fin reaching within 2 scale rows of pelvic bases and pelvic fins reaching within 2 or 3 scale rows of anus; greatest depth at origin of dorsal fin about 2.6 to 2.9 in the standard length and head 3.0 to 3.6; least depth of caudal peduncle about equal to length of anal base and a little shorter than postorbital length of head; pelvic insertion a little closer to midcaudal fin base than to tip of the snout; rear margin of eye at middle of head length; short predorsal plate bicuspid, with a black fleshy flap the size of a scale covering the points of this plate anteriorly; intestine much coiled; pyloric caeca very small and very numerous, probably a few hundred in number.

Color.—Darker above, paler below, the sides with about 16 vertical bars that are a little wider than the pale interspaces, width of bars about equal to diameter of pupil; these vertical blackish bars breaking up ventrally and anteriorly into a few roundish blotches, all bars distinct up to a length of 150 mm., becoming obsolete on the largest specimens; dorsal fin barred with the black spots at front of dorsal rays; other fins plain grayish in color; peritoneum blackish; the margins of the scales blackish, on some this pigment being more intense dorsally and ventrally, giving the appearance of a wavy blackish line along each row of scales. When alive, the dorsal fin was pinkish and the sides of the body yellowish.

The following differences between the various subspecies are worthy of emphasis: *Prochilodus reticulatus reticulatus* differs from *P. r. magdalenae* in having 42 or 43 scales from the upper end of the gill opening to midbase of caudal instead of 44 to 47, usually 45; the number of pectoral fin rays average fewer too, i, 13 to i, 16, usually i,14 or i,15, instead of i,14 to i,17, usually i,15 or i,16 in *P. r. magdalenae*. The vertical color bars in *P. r. reticulatus* tend to break up into roundish blotches ventrally and anteriorly, while in *P. r. magdalenae* they are unbroken ventrally. Although little is known about *Prochilodus reticulatus asper* from Caracas, Venezuela, *P. r. reticulatus* and *P. r. magdalenae* differ from it in having 9 branched rays in the dorsal instead of 10 and in having 7 or 8 scales above the lateral line instead of 8 or 9.

PROCHILODUS RETICULATUS ASPER Lütken

Prochilodus asper Lütken, Vid. Medd. Naturh. Foren. Kjøbenhavn, 1874, pts. 12–16, p. 226 (Caracas, Venezuela).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 48, 1891 (Caracas).

PROCHILODUS LATICEPS Steindachner

Prochilodus laticeps Steindachner, Anz. Akad. Wiss. Wien, vol. 16, p. 150, 1879 (no locality given); Denkschr. Akad. Wiss. Wien, vol. 41, p. 152, 1879 (Ciudad Bolívar, Venezuela).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 48, 1891 (Orinoco near Ciudad Bolívar).

?*Prochilodus brama* (not of Cuvier and Valenciennes) PETERS, Montasb. Akad. Wiss. Berlin, 1877, p. 472 (Calabozo, Venezuela).—EIGENMANN and EIGENMANN, Proc. U. S. Nat. Mus., vol. 14, p. 48, 1891 (Calabozo).

?*Prochilodus kneri* PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 15, p. 155, 1909 (Orinoco) [new name for *P. insignis* of Kner and of Günther, not Schomburgk].

Genus CHILODUS Müller and Troschel

Chilodus MÜLLER and TROSCHEL, Horae ichthyologicae, pts. 1, 2, p. 10, pl. 4, fig. 2, 2a, 1845 (Lake Amucu, Guiana). (Type, *Chilodus punctatus* Müller and Troschel.)

Microdus KNER, Sitzb. Akad. Wiss. Wien, vol. 30, p. 77, 1858; Denkschr. Akad. Wiss. Wien, vol. 17, p. 149, pl. 3, fig. 5, 1859. (Type, *Microdus labyrinthicus* Kner.)

Caenotropus GÜNTHER, Catalogue of the fishes in the British Museum, vol. 5, p. 297, 1864 (substitute name for *Chilodus* and *Microdus* said to be preoccupied.)

CHILODUS LABYRINTHICUS (Kner)

Microdus labyrinthicus KNER, Denkschr. Akad. Wiss. Wien, vol. 17, p. 149, pl. 3, fig. 5, 1859 (Rio Branco and Barra do Rio Negro.)

Caenotropus labyrinthicus STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 41, p. 153, 1879 (Ciudad Bolívar, Venezuela.)

Chilodus labyrinthicus EIGENMANN and EIGENMANN, Proc. U. S. Nat. Mus., vol. 14, p. 49, 1891 (Orinoco.)

This species has a pale streak along midaxis of body and only iii, 7 anal rays. *Chilodus punctatus* has iii,10 anal rays and a black lateral streak.

Genus LEPORELLUS Lütken

Leporellus LÜTKEN, Overs. Danske Vid. Selsk. Forh., 1874, pp. 129, 141. (Type, *Leporinus pictus* Kner=*Leporellus pictus* Lütken [1875, on Rio das Velhas specimen]=*Leporinus maculifrons* Reinhardt, in Lütken=*Leporellus timbore* Eigenmann.)

Leporinodus EIGENMANN, Mem. Carnegie Mus., vol. 9, No. 1, p. 116, 1922. (Type, *Leporinodus retropinnis* Eigenmann, on Rio Piracicaba specimen.)

There is considerable confusion concerning the specific identity of the species referred to this genus, largely because it is so scarce in museum collections that no investigator has been able to examine all the species at one time. In addition, the descriptions are not adequate. I have attempted to clarify in this discussion certain necessary nomenclatorial changes, as a result of Eigenmann's proposal of the genus *Leporinodus* and his overlooking of the available name for his *Leporellus timbore*.

The following tentative key was prepared mostly from the figures and descriptions of the species referred to this genus as noted in the literature. The genus needs careful revision.

1*a*. Origin of dorsal about equidistant between tip of snout and base of caudal fin;[8] head spotted above and on sides; predorsal scales with a dark spot at

[8] It is assumed that Eigenmann (1922, p. 116) meant base of caudal in his statement, "Origin of dorsal about equidistant from snout and caudal. . ."

base; a dark lateral band to end of caudal; light bands above and below it, 2 darker lines along 2 rows of scales below lateral band; dorsal with dark spot from middle of anterior rays to tip of seventh, another along middle of last 5 rays; 3 oblique bands across caudal lobes.

Leporellus retropinnis (Eigenmann) [9]

1*b*. Origin of dorsal closer to tip of snout by about length of snout than to base of caudal fin.

2*a*. Upper sides of body and back with 7 or 8 parallel rows of dark spots, each scale with dark spot including 1 or 2 scale rows below lateral line, then lower sides abruptly pale without spots; dorsal with blackish band across third quarter of its length, distal fourth white; 2 oblique black bars across each caudal lobe and a black streak on midcaudal fin rays; no black lateral band except a faded one on caudal peduncle posteriorly and thence on middle rays of caudal fin; top and sides of head with small black spots---------- **Leporellus vittatus** (Valenciennes)

2*b*. A distinct blackish band along midaxis from head to tip of midcaudal fin rays, no dark spots on each scale posteriorly on body; a dark stripe along side of back, or back blackish; sometimes each of predorsal scales with a black spot; dorsal fin with a wide black band distally; 2 oblique black bands on each lobe of caudal fin; sides and top of head with spots.

3*a*. Anal fin with a black band---- **Leporellus sexdentatus** (Eigenmann) [10]

3*b*. Anal fin pale without black band or spot-- **Leporellus pictus** (Kner) [11]

LEPORELLUS VITTATUS (Valenciennes)

Leporinus vittatus VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 22, p. 33, 1849 (Amazon).—CASTELNAU, Animaux nouveaux ou rares l'Amérique du Sud, Poissons, p. 59, pl. 29, fig. 3, 1855 (Araguay, Province of Goyaz, Brazil).—GÜNTHER, Catalogue of the fishes in the British Museum, vol. 5, p. 310, 1864 (Rio Araguay; Irisanga).

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[9] *Leporinodus retropinnis* Eigenmann, Mem. Carnegie Mus., vol. 9, No. 1, p. 116, 1922 (Rio Piracicaba), Brazil.

[10] *Leporinodus sexdentatus* Eigenmann, Mem. Carnegie Mus., vol. 9, No. 1, p. 117, 1922 (Río Cauca) (new name).

Leporinus vittatus (non Valenciennes) Steindachner, Denkschr. Akad. Wiss. Wien, vol. 42, p. 71, 1879 (Río Cauca, Colombia).

[11] It is possible that *L. sexdentatus* and *L. pictus* are not distinct species. These two forms need careful comparison, as Eigenmann apparently lacked specimens of both species. The following nomenclatorial observations and other comments should be carefully considered when this genus is further investigated:

Leporinus pictus Kner, Denkschr. Akad. Wiss. Wien, vol. 17, p. 172, pl. 8, fig. 19, 1859 (Irisanga).

Leporellus pictus (Kner) LÜTKEN, Overs. Danske Vidk. Selsk. Forh., 1874, pp. 129, 141 (Rio das Velhas); Danske Vid. Selsk. Skrift., vol. 12, No. 2, pp. 204, xi, 1875 (Rio das Velhas).

Leporinus maculifrons REINHARDT, in Lütken, 1875, *ibid.*, p. 204, is given as a new specific name in case this specimen from the Rio das Velhas, as stated on p. 206 by Lütken, proves to be a distinct species. Reinhardt's *maculifrons* was a manuscript name and apparently unpublished until 1875 by Lütken.

Leporellus timbore Eigenmann, Mem. Carnegie Mus., vol. 9, No. 1, p. 117, 1922 (Rio das Velhas), a new name said by Eigenmann to be a substitute for "*Leporellus pictus* (non *Leporinus pictus* Kner) Lütken and is based on the specimen from the Rio das Velhas."

Leporellus cartledgii Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 93, p. 177, fig. 89, 1941 (Penedo, Rio São Francisco, Pernambuco).

Leporellus vittatus Cope, Proc. Amer. Philos. Soc., vol. 17, p. 690, 1878 (Peruvian Amazon).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 58, p. 327, 1906 (Peruvian Amazon);? vol. 66, p. 236, 1914 (Rupununi River, British Guiana).

Lütken (1875, p. 205) describes the color of the Rio das Velhas specimen as follows: Back brownish gray, paler on sides; lower sides brass-yellow in recently caught specimens; belly white; occiput to end of dorsal has a dark stripe along upper sides; a dark lateral band or stripe along midsides continuing out on tail fin; sides of head silvery; upper parts of head grayish with dark spots, these more or less present on back anteriorly at base of each scale but fading posteriorly; dorsal fin with a broad band in distal half of fin; base of caudal fin with two oblique dark stripes. This description agrees with that of Kner's figure of *L. pictus* in essential details.

U. S. N. M. No. 121406, 2 specimens, 123 and 154 mm.—standard length, collected by L. P. Schultz, G. Zuloaga, Roger Sherman, and William Phelps, Jr., on May 12, 1942, in the Río Guárico and tributaries between San Sebastián and San Casimiro, Estado de Aragua, Venezuela.

The following counts are recorded for the two specimens listed above and another, U. S. N. M. No. 100776, from the Río Meta Basin, Colombia, respectively: Dorsal rays ii, 9; ii, 10; ii, 10; anal ii, 8; ii, 8; ii, 8; pectoral i, 15–i, 15; i, 15–i, 15; i, 15–i, 15; pelvic i, 8–i, 8; i, 8–i, 8; i, 8–i, 8. Number of scales along lateral line 41, 42, 42; above lateral line to base of dorsal fin 5½, 5½, 5; below lateral line to pelvic insertion 4, 4, 4. Number of scales in front of dorsal 12, 12½, 13½. Number of gill rakers on first gill arch 16+16. This is the only *Leporellus* so far recorded from Venezuela.

Genus LEPORINUS Agassiz

Leporinus Agassiz, *in* Spix, Selecta genera et species piscium . . . Brasiliam . . ., p. 65, 1829. (Type, *Leporinus novemfasciatus* Agassiz.)

The following species of *Leporinus* have been recorded from Venezuela or the Orinoco system. Since I do not have specimens of these species from the Orinoco system, I cannot work out the relationships with any degree of certainty and no key is attempted.

LEPORINUS FRIDERICI (Bloch)

Salmo friderici Bloch, Ichthyologie, ou histoire naturelle . . . des poissons, vol. 11, p. 75, pl. 378, 1797 (Surinam).

Leporinus friderici Eigenmann and Allen, Fishes of western South America, p. 305, 1942 (Venezuela).

Leporinus leschenaultii Peters, Monatsb. Akad. Wiss. Berlin, 1877, p. 472 (Venezuela).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 51, 1891 (Calabozo).

Leporinus leschenaulth Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 157, 1899 (Apure River, Venezuela).

LEPORINUS STRIATUS Kner

Leporinus striatus Kner, Denkschr. Akad. Wiss. Wien, vol. 17, p. 171, pl. 8, fig. 18, 1859 (Irisanga and Caicara in Matto Grosso).—Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 157, 1899 (Río Apure).

LEPORINUS FASCIATUS (Bloch)

Salmo fasciatus Bloch, Ichthyologie, ou histoire naturelle . . . des poissons, vol. 11, p. 77, pl. 379, 1797 (Surinam).

Leporinus fasciatus Peters, Monatsb. Akad. Wiss. Berlin, 1877, p. 472 (Calabozo, Venezuela).—Steindachner, Denkschr. Akad. Wiss. Wien, vol. 41, p. 155, 1879 (Ciudad Bolívar).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 51, 1891 (Orinoco; Calabozo).

LEPORINUS AFFINIS Günther

Leporinus affinis Günther, Catalogue of the fishes in the British Museum, vol. 5, p. 308, 1864 (Para, Río Capin).—Steindachner, Denkschr. Akad. Wiss.

Wien, vol. 41, p. 155, 1879 (Ciudad Bolívar).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 51, 1891 (Orinoco).—Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 157, 1899 (Apure River, Venezuela).

LEPORINUS HYPSELONOTUS Günther

Leporinus hypselonotus Günther, Proc. Zool. Soc. London, 1868, p. 244, pl. 22 (Xeberos).—Steindachner, Denkschr. Akad. Wiss. Wien, vol. 44, p. 12, 1882 (Ciudad Bolívar).—Eigenmann and Allen, Fishes of western South America, p. 308, 1942 (Orinoco).

LEPORINUS MÜLLERI Steindachner

Leporinus mülleri Steindachner, Denkschr. Akad. Wiss. Wien, vol. 44, p. 12, 1882 (Orinoco at Ciudad Bolívar).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 51, 1891 (Orinoco).—Eigenmann and Allen, Fishes of western South America, p. 306, 1942 (Orinoco).

Genus GNATHODOLUS Myers

Gnathodolus Myers, Bull. Mus. Comp. Zool., vol. 68, No. 3, p. 108, 1927. (Type, *Gnathodolus bidens* Myers.)

GNATHODOLUS BIDENS Myers

Gnathodolus bidens Myers, Bull. Mus. Comp. Zool., vol. 68, No. 3, p. 108, 1927 (Río Cassiquiare, Chemoni [near Bifurcation], Laga Tama-Tama, Bifurcation, Venezuela).

Genus SCHIZODON [12] Agassiz

Schizodon Agassiz, *in* Spix, Selecta genera et species piscium . . . Brasiliam. . . , p. 66, pl. 36, 1829. (Type, *Curimatus fasciatus* Agassiz.) (Ref. copied.)

KEY TO THE SPECIES OF SCHIZODON REPORTED FROM VENEZUELA

1*a*. Side of body with 4 broad vertical black bars sometimes reduced to a triangular blotch along midsides and a black spot at end of lateral line; first vertical black bar occurring above middle of length of pectoral fin, second under dorsal fin, third and fourth between base of dorsal fin and adipose origin; scales usually 4½ to 5½+41 to 44+4 or 5.

2*a*. Number of scales between lateral line and origin of dorsal fin 5½; scales from lateral line to anal origin 5; gill rakers about 25 to 30.
Schizodon fasciatum corti, new subspecies

2*b*. Number of scales between lateral line and origin of dorsal fin 4½; scales from lateral line to anal origin 4; gill rakers on two specimens 21 and 24.
Schizodon fasciatum fasciatum Agassiz

1*b*. Along midaxis of body a wide black band extending to tips of middle caudal fin rays, this band set off by a pale streak above it and paler color below it; scales 6½+44 to 46+5 ..... **Schizodon isognathus** Kner

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[12] The following key will aid in the separation of those genera related to *Schizodon*. *Anostomus* Scopoli, Introductio ad historiam naturalem . . ., p. 451, 1777; Cuvier and Cloquet, Dict. Sci. Nat., ed. 2, p. 2, suppl. p. 69, 1816 (type, *Salmo anostomus* Linnaeus), as yet has not been reported from Venezuela.

1*a*. Middle teeth of lower jaw trifid, with 3 points (fig. 31, *a*); mouth terminal, somewhat oblique; lips not plicate ..... *Schizodon* Agassiz

1*b*. Middle teeth of lower jaw incisors with truncate edge (fig. 31, *b*); mouth terminal, oblique; lips not plicate. *Laemolyta* Cope

1*c*. Middle teeth of lower jaw bifid with 2 points (fig. 31, *c*); snout elongate; mouth oblique opening dorsally; lips plicate ..... *Anostomus* Scopoli

SCHIZODON FASCIATUM CORTI, new subspecies

CORTI

FIGURES 30, 31, *a*

Piabuca schizodon VALENCIENNES, *in* Cuvier and Valenciennes (in part), Histoire naturelle des poissons, vol. 22, p. 112, 1849 (Lago Maracaibo).

Holotype.—U. S. N. M. No. 121300, a specimen 258 mm. in standard length, collected by Leonard P. Schultz, February 21, 1942, in the Río Palmar near Totuma, about 100 km. southwest of Maracaibo.

Paratypes.—All the paratypes were collected by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela.

FIGURE 30.—*Schizodon fasciatum corti*, new subspecies: Holotype, U.S.N.M. No. 121300, 258 mm. in standard length.

FIGURE 31.—Enlargement of one of middle teeth of lower jaw: *a*, *Schizodon fasciatum corti*, new subspecies; *b*, *Laemolyta varius nitens* (Garman); *c*, *Anostomus anostomus* (Linnaeus).

U.S.N.M. No. 121306, 10 specimens, 166 to 335 mm. in standard length, taken along with the holotype and bearing same data.

U.S.N.M. No. 121307, 15 examples, 131 to 335 mm., February 24, Río Socuy, 3 km. above its mouth.

U.S.N.M. No. 121302, 4 examples, 153 to 230 mm., taken March 6 in the Río Palmar at bridge, 70 km. southwest of Maracaibo.

U.S.N.M. No. 121304, 2 specimens, 280 and 290 mm., taken March 2 in the Río Negro below mouth of Río Yasa.

U.S.N.M. No. 121301, 4 specimens, 146 to 179 mm., obtained March 11 from a caño ¾ km. west of Sinamaica.

U.S.N.M. No. 121305, 5 specimens, 232 to 263 mm., collected February 26 from the Río Apón about 35 km. south of Rosario.

U.S.N.M. No. 121303, a specimen, 285 mm., obtained March 17 in the Río Motatán at the bridge, 22 km. north of Motatán.

Description.—Based on the holotype and paratypes. Detailed measurements, expressed in hundredths of the standard length, were made on the holotype and one paratype as recorded below, first for the holotype, then for the paratype in parentheses. Standard length in mm. 258 and 222.

Length of head 23.6 (24.0); greatest depth of body 23.0 (22.8); length of snout 9.00 (9.01); greatest width of head 13.6 (12.6); diameter of eye or between eyelids along anterior-posterior axis 4.38 (4.46); interorbital space 11.4 (11.9); postorbital length of head 12.0 (12.3); eye to posterior nostril 2.67 (2.48); length of caudal peduncle 12.0 (11.9); least depth of caudal peduncle 9.97 (9.65); distance from snout to dorsal origin 41.8 (41.1); snout to anal origin 83.4 (82.0); snout to adipose origin 86.0 (84.7); snout to pectoral insertion 22.2 (23.1); snout to pelvic insertion 45.3 (46.0); length of base of dorsal 14.7 (13.8); length of anal base 8.02 (8.07); longest ray of dorsal fin 21.9 (19.6); longest ray of anal 15.3 (13.9); longest ray of pectorals 15.2 (14.6); longest ray of pelvics 17.1 (16.0); longest ray of caudal fin 25.2 (22.8); shortest caudal fin rays 9.69 (8.10).

The following counts were made on the holotype and paratype, respectively: Dorsal rays ii, 10 (ii, 10); anal ii, 8 (ii, 8); pectoral i, 15–i, 15 (i, 15–i, 15); pelvic i, 8–i, 8 (i, 8–i, 8); scales 42 (43) from upper end of gill opening to base of midcaudal fin rays; scales from dorsal fin origin to lateral line posteriorly downward 5½ (5½): scales from anal origin to lateral line (backward and upward) 5 (5); scales before dorsal fin 13 (13); zigzag scales around caudal peduncle 16 (16); scales from dorsal base to adipose origin 16 (16). For additional counts see table 8.

TABLE 8.—*Counts made on subspecies of* Schizodon fasciatum

Subspecies	Number of fin rays					Number of scales											
	Dorsal	Anal	Pelvic	Pectoral		Lateral line				Above lateral line		Below lateral line		Before dorsal		Dorsal base to adipose origin	
	ii, 10	ii, 8	i, 8	i, 15	i, 16	41	42	43	44	4½	5½	4	5	12	13	15	16
corti	9	9	11	12	3	1	5	2	2	----	21	----	21	----	5	3	2
fasciatum	2	2	4	2	2	1	1	----	----	2	----	2	----	2	----	1	1

Subspecies	Number of gill rakers on first gill arch																				
	Above				At angle	Below							Total								
	10	11	12	13	1	10	11	12	13	14	15	16	21	22	23	24	25	26	27	28	29	30
corti	----	1	2	1	4	----	----	----	2	----	1	1	----	----	----	----	1	1	----	1	----	1
fasciatum	1	1	----	----	2	1	----	1	----	----	----	----	1	----	----	1	----	----	----	----	----	----

Body elongate, head rounded, body a little compressed, forward part of head a little depressed, interorbital considerably convex; eyes lateral, seen as well from below as from above; anterior and posterior nostrils separated by a small isthmus of skin, the anterior nostril tubular; snout rounded, mouth small, terminal; teeth broad, tricuspid incisors in a single row of 8 in upper and 8 in the lower jaw, none of which is produced forward; premaxillaries not protractile; eye with adipose eyelids wider anteriorly; gill membranes joined to isthmus, no free fold across it; pelvics inserted under the third branched ray of dorsal; anal fin origin a little in front of that of adipose fin; intestinal canal short; about 20 pyloric caeca; anus just in front of anal origin; greatest depth 4 to 4½ and head 4 to 4½ in standard length; diameter of orbit 3½ to 4½, and of eye (between eyelids) 4⅘ to 6¾, interorbital 2⅘ to 2⅔, snout 2¾ to 3, all in the head; second simple ray of dorsal about equal to first branched rays; first branched rays of anal longest; first branched rays of paired fins longest; posterior margins of dorsal, pectoral and paired fins a little rounded; that of anal a little concave; caudal deeply forked, the upper lobe usually a little longer; gill rakers short; the pectorals reach two-thirds the way to the pelvic insertion and the pelvics one-half the way to the anus; scales large.

Color.—Brownish above, yellowish white below; sides with four broad vertical black bars sometimes reduced to a triangular blotch along midsides and a black spot at end of lateral line; the first vertical black bar on the body occurring above the middle of length of pectoral fin, second under dorsal fin, third and fourth between base of dorsal fin and adipose origin; adipose fin dusky to blackish in color; anal fin dusky as are caudal and dorsal fins; upper parts of head blackish; opercle blackish; peritoneum pale.

Remarks.—This new subspecies may be distinguished from *S. fasciatum fasciatum* by the key on page 268. Figure 31, *b*, *c*, illustrates the different shapes of the teeth in *Laemolyta* and *Anostomus*.

Named *corti* (=cut) after the common name of this fish in the Maracaibo Basin, as given to me on several occasions, probably referring to its sharp "cutting" teeth.

SCHIZODON FASCIATUM FASCIATUM Agassiz

Schizodon fasciatus Agassiz, *in* Spix, Selecta genera et species piscium . . . , p. 66, pl. 36, 1829 (ref. copied).—Eigenmann and Allen, Fishes of western South America, p. 303, 1942 (Venezuela to the Amazons and Río Paraguay).

Anostomus fasciatus Günther, Catalogue of the fishes in the British Museum, vol. 5, p. 304, 1864 (Caracas).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 50, 1891 (Caracas).

SCHIZODON ISOGNATHUS Kner

Schizodon isognathus Kner, Denkschr. Akad. Wiss. Wien, vol. 17, p. 163, pl. 6, fig. 13, 1859 (Río Cujaba).

Anostomus isognathus Peters, Monatsb. Akad. Wiss. Berlin, 1877, p. 472 (San Fernando de Apure, Venezuela).

Genus LAEMOLYTA Cope

Laemolyta Cope, Proc. Acad. Nat. Sci. Philadelphia, vol. 23, p. 258, 1872 (type, *Schizodon taeniatus* Kner).—Eigenmann and Allen, Fishes of western South America, p. 302, 1942 (Orinoco).

Schizodontopsis Garman, Bull. Essex Inst., vol. 22, No. 4, p. 18, 1890. (Type, *Schizodon taeniatus* Kner.)

LAEMOLYTA ORINOCENSIS (Steindachner)

Anostomus orinocensis Steindachner, Denkschr. Akad. Wiss. Wien, vol. 41, p. 154, pl. 2, fig. 7, 7a, 1879 (Ciudad Bolívar, Venezuela); Anz. Akad. Wiss. Wien, vol. 16, p. 150, 1879.—Garman, Bull. Essex Inst., vol. 22, No. 4, p. 20, 1890.

Laemolyta orinocensis Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 50, 1891 (Orinoco).

Genus HYDROLYCUS Müller and Troschel

Hydrolycus Müller and Troschel, Arch. Naturg., vol. 10, No. 1, p. 93, 1844; Horae ichthyologicae, pt. 1, p. 19, pl. 5, fig. 2, 1848. (Type, *Hydrocyon scomberoides* Cuvier.)

KEY TO THE SPECIES OF HYDROLYCUS [13]

1*a*. Pelvic fin base remote from midline of belly, distance from upper edge of pelvic base to midventral knifelike edge of belly about equal to least depth of caudal peduncle; anal rays 43 to 48 (probably iii, 40 to iii, 45); pectoral almost always i, 17; pelvic i, 8; a black spot at base of lower and upper pectoral fin rays, another on adipose fin; humeral black blotch roundish; distal portion of caudal fin rays pale.

Hydrolycus pectoralis (Günther) [14]

1*b*. Pelvic fin base little above midline of belly, distance from upper edge of pelvic base to midventral ridge (not a thin keel) 2 to 2⅕ times in least depth of caudal peduncle; anal rays 33 to 35 (probably iii, 31 to iii, 33); pectoral almost always i, 16; pelvic i, 8; no black spot at base of lower pectoral fin rays and no black blotch on inside of base of upper pectoral fin ray; adipose fin with black spot; humeral black blotch elongate; distal half of caudal fin rays blackish, contrasting with pale basally.

Hydrolycus scomberoides (Cuvier)

HYDROLYCUS SCOMBEROIDES (Cuvier)

Payara

Hydrocyon scomberoides Cuvier, Mem. Mus. Hist. Nat. Paris, vol. 5, p. 357, pl. 27, fig. 2, 1819.

Cynodon scombroides Peters, Monatsb. Akad. Wiss. Berlin, 1877, p. 472 (Venezuela).—Röhl, Fauna descriptiva de Venezuela, p. 385, 1942 (Venezuela)

[13] Since no specimen of the third species, *Hydrolycus copei* Gill, is available for examination, I am unable to place it correctly in the above key. I quote Gill's description from Proc. Acad. Nat. Sci. Philadelphia, vol. 22, p. 93, 1870:

"D. 11. A. 43. The height enters 2¾ times in the length (exclusive of the caudal), the length of the head 3½; the profile between the nape and convex snout is moderately incurved; the interorbital space is slightly arched, and about equal to the orbit, the snout, and a quarter of the head's length. The maxillary passes considerably behind the vertical of the posterior border of the orbit. The dorsal fin commences above the anus. The pectorals pass for a third of their own length beyond the tip of the ventrals, and the ventrals extend backwards to the third or fourth anal ray.

"The lateral spot is faint, and above the lateral line, just in advance of the vertical of the anus." From the Napo and Maranon Rivers. Known only from the four types.

[14] Based on Günther's original description and three specimens in the United States National Museum, Nos. 5686, 39402, and 94669. Not yet reported from Venezuela.

Counts were made on certain specimens of *Hydrolycus* in the United States National Museum, and these data are recorded in table 9.

The following specimen was collected for me through the courtesy of Dr. Walter Dupouy, director of the Museo de Ciencias Naturales, Caracas:

U. S. N. M. No. 121385, a specimen, 240 mm. in standard length, collected by Eduardo Correa, March 19, 1942, in the Río Paya, a tributary of the Río Guárico.

TABLE 9.—*Counts made on species of* Hydrolycus

Species	Number of fin rays																	
	Anal														Dorsal	Pectoral		Pelvic
	iii, 33	iii, 34	iii, 35	iii, 36	iii, 37	iii, 38	iii, 39	iii, 40	iii, 41	iii, 42	iii, 43	iii, 44	iii, 45	iii, 46	ii, 10	i, 16	i, 17	i, 8
pectoralis	----	----	----	----	----	----	----	----	----	----	1	1	----	1	3	----	6	6
scomberoides	1	----	----	----	----	----	----	----	----	----	----	----	----	----	1	2	----	2

Genus RHAPHIODON Agassiz

Rhaphiodon AGASSIZ, *in* Spix, Selecta genera et species piscium . . . Brasiliam . . . , p. 59, 1829. (Type, *Rhaphiodon vulpinus* Agassiz.)

RHAPHIODON VULPINUM Agassiz

"PAYARA"

Rhaphiodon vulpinus AGASSIZ, *in* Spix, Selecta genera et species piscium . . . Brasiliam . . . , p. 59, 1829.

Cynodon vulpinus PETERS, Monatsb. Akad. Wiss. Berlin, 1877, p. 472 (Calabozo, Venezuela).—EIGENMANN and EIGENMANN, Proc. U. S. Nat. Mus., vol. 14, p. 59, 1891 (Calabozo).—PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 157, 1899 (Apure River, Venezuela).

Rhaphiodon vulpinum EIGENMANN and ALLEN, Fishes of western South America, p. 271, 1942 (Orinoco Basin to La Plata Basin).

Genus TRIPORTHEUS Cope

Triportheus COPE, Proc. Acad. Nat. Sci. Philadelphia, vol. 23, p. 264, pl. 8, fig. 3; pl. 14, fig. 2, 1872. (Type, *Triportheus albus* Cope.)

Chalcinus [15] VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 22, p. 258, 1849 (preoccupied). (Type, *Chalcinus brachypomus* Valenciennes=*Chalceus angulatus* Agassiz.)

The recent study by Paulo de Miranda Ribeiro (Papeis Avulsos Dept. Zool. Sci. Agr. São Paulo, Brasil, vol. 1, art. 18, pp. 159–174, figs., 1941) of the genus *Chalcinus* did not prove very satisfactory, as in some cases his counts in the key are not in agreement with the descriptions of the species.

[15] According to Myers (Stanford Ichth. Bull., vol. 1, No. 5, p. 170, 1940), *Triportheus* replaces *Chalcinus*.

KEY TO THE SPECIES OF TRIPORTHEUS FROM VENEZUELA AS REPORTED IN THE LITERATURE

1*a*. Scales 31 to 33; anal rays 28 to 30 ..... **Triportheus angulatus** (Agassiz)

1*b*. Scales 35 to 37; anal rays 26 or 27; gill rakers on first gill arch 30 to 42 ..... **Triportheus rotundatus** (Schomburgk)

1*c*. Scales 40 to 43; anal rays 27 to 30; gill rakers 20 to 25. **Triportheus elongatus** (Günther)

No specimens from the Orinoco Basin were available to me for studying this genus; therefore, the three species herein listed need careful study from that stream system if and when collected.

TRIPORTHEUS ANGULATUS (Agassiz)

Chalceus angulatus Agassiz, *in* Spix, Selecta genera et species piscium . . . Brasiliam . . . , p. 67, 1829 (ref. copied).

Chalcinus angulatus Steindachner, Denkschr. Akad. Wiss. Wein, vol. 41, p. 157, 1879 (Ciudad Bolívar, Venezuela).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 56, 1891 (Orinoco).—Eigenmann and Allen, Fishes of western South America, p. 261, 1942 (Orinoco Basin to Amazons and the Paraguay).

TRIPORTHEUS ROTUNDATUS (Schomburgk)

Chalceus rotundatus Schomburgk, The natural history of the fishes of [British] Guiana, vol. 1, p. 209, 1841 (ref. copied).

Chalcinus brachypomus Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 157, 1899 (Apure River, Venezuela).—? Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 83, p. 408, 1931 (Caño Guanoco, Venezuela).

TRIPORTHEUS ELONGATUS (Günther)

Chalcinus elongatus Günther, Catalogue of the fishes in the British Museum, vol. 5, p. 342, 1864 (locality ?).—Steindachner, Denkschr. Akad. Wiss. Wien, vol. 41, p. 157, 1879 (Ciudad Bolívar, Venezuela).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, 1891 (Orinoco).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 63, p. 432, 1911 (La Pedrita, on Caño Uracoa, Venezuela).—Eigenmann and Allen, Fishes of western South America, p. 262, 1942 (Orinoco and Guianas to Amazons).

Subfamily Gasteropelecinae

KEY TO THE GENERA AND SPECIES OF GASTEROPELECINAE FROM VENEZUELA

1*a*. No adipose fin; dorsal rays 10; anal 22 or 23; scales 26; head 3⅔, depth 2, in standard length; maxillary with a single tooth; no dark wavy cross bands; dark line from above pectoral to caudal base; dark band around lower jaw to eye and another lower down; two dark lines backward from eye across opercle; entire lower edge of body from caudal to chin bounded by a narrow dark line, this forking on breast, one branch on each side, leaving a narrow median V-shaped area below chin ..... **Carnegiella marthae** Myers

1*b*. Adipose fin present, well developed; maxillary with 3 to 5 well-developed teeth.

2*a*. Premaxillary with a single tow of tricuspid teeth; anterior profile nearly straight ..... **Gasteropelecus** Scopoli [16]

2*b*. Premaxillary with a double tow of tricuspid teeth, outer row represented by 1 to 3 teeth; anterior profile convex (*Thoracocharax*).

[16] Not reported from Venezuela.

3*a*. Scale rows from upper edge of gill opening to base of caudal fin 20; anal rays about iii, 39 to iii, 41; dorsal about iii, 12; pectoral about i, 11; usually 2 or 3 teeth in outer premaxillary row.

Thoracocharax stellatus (Kner)

3*b*. Scale rows from upper edge of gill opening to base of caudal fin about 29 to 31; anal rays iii, 27 to 33; dorsal usually ii, 9; pectoral usually i, 10 or i, 11; gill rakers usually 4 to 8 + 11 to 15; usually but one tooth in outer premaxillary row.

4*a*. Below base of each dorsal ray along distal tips of each pterygiophore are short black streaks giving appearance of a black blotch at base of dorsal fin; anal rays usually iii, 29 to iii, 31 (see table) (Magdalena and Maracaibo Basins).

Thoracocharax maculatus magdalenae Eigenmann

4*b*. Black spot below base of dorsal fin absent or nearly so; anal rays usually iii, 30 to iii, 32 (Pacific slope of Panama and in Río San Juan and Río Atrato in Colombia).

Thoracocharax maculatus maculatus (Steindachner) [16]

Genus CARNEGIELLA Eigenmann

Carnegiella Eigenmann, Ann. Carnegie Mus., vol. 6, No. 1, p. 13, 1909. (Type, *Gasteropelecus strigata* Günther.)

CARNEGIELLA MARTHAE Myers

Carnegiella marthae Myers, Bull. Mus. Comp. Zool., vol. 68, No. 3, p. 119, 1927 (Caño de Quiribana, near Caicara and opposite Pan de Azucar, and creek into Laguna San Raphael, Caicara, all Venezuela); Stanford Ichth. Bull., vol. 2, No. 4, p. 93, 1942 (Río Orinoco).

Genus THORACOCHARAX Fowler

Thoracocharax Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 58, p. 452, 1906. (Type, *Gasteropelecus stellatus* Kner.)

THORACOCHARAX STELLATUS (Kner)

Gasteropelecus stellatus Kner, Denkschr. Akad. Wiss. Wien, vol. 18, p. 17, pl. 1, fig. 2, 1859 (Río Cujaba).—Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 157, 1899 (Apure River, Venezuela).

Thoracocharax stellatus Eigenmann and Allen, Fishes of western South America, p. 268, 1942 (Orinoco).

THORACOCHARAX MACULATUS MAGDALENAE Eigenmann

Thoracocharax magdalenae Eigenmann, Indiana Univ. Bull., vol. 10, No. 8, p. 25, 1912 (Girardot, Colombia).

The following collections were made by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121423, 66 specimens, 33 to 48 mm. in standard length, taken March 16, in the Río Machango at bridge, south of Lagunillas, Estado de Zulia.

U.S.N.M No. 121421, 3 examples, 38 to 46 mm., taken February 26, in a stagnant pool of Río San Ignacio, about 20 km. south of Rosario.

U.S.N.M. No. 121422, 14 examples, 12 to 45 mm., March 2, from Río Negro below mouth of Río Yasa.

[16] Not reported from Venezuela.

TABLE 10.—*Counts made on subspecies of* Thoracocharax maculatus

Subspecies	Number of rays in anal fin						
	iii, 27	iii, 28	iii, 29	iii, 30	iii, 31	iii, 32	iii, 33
maculatus	----------	1	4	8	13	10	3
magdalenae	1	2	14	18	8	3	3

Genus CHARACIDIUM Reinhardt

VOLADORITAS

Characidium REINHARDT, Overs. Danske Vid. Selsk. Forh. Kjøbenhavn, 1866, p. 56, pl. 2, fig. 1–2. (Type, *Characidium fasciatum* Reinhardt.)

Chorimycterus COPE, Amer. Nat., vol. 28, p. 67, 1894. (Type, *Chorimycterus tenuis* Cope.)

Nanognathus BOULENGER, Bol. Mus. Zool. Anat. Comp. Univ. Torino, vol. 10, No. 196, p. 3, 1895. (Type, *Nanognathus borelli* Boulenger.)

Poecilosomatops FOWLER, Proc. Acad. Nat. Sci. Philadelphia, vol. 58, p. 323, 1906. (Type, *Characidium etheostoma* Cope.)

Jobertina PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 15, pp. 149, 151, 1909. (Type, *Characidium* (*Jobertina*) *interruptum* Pellegrin.)

Upon examination of the fishes of this general relationship from the Maracaibo Basin, I have observed certain features that caused me to ponder for some time over the generic relationships, as well as the validity of certain species, but I do not have available certain critical species that must be studied before the fishes of this genus are properly compared. In the National Museum are two of Lütken's specimens from South America (U. S. N. M. No. 44950) of what I believe is the valid *Characidium fasciatum* Lütken. In coloration and in all respects they agree with his figures. I partially dried the lower jaw of one of these specimens and found a second row of minute teeth projecting inward along the bases of the single row of larger teeth. *Chorimycterus* Cope is described as having two series of teeth in the lower jaw, but Fowler (1906, p. 325) says, "The presence of biserial mandibular teeth is entirely fallacious, as both of the cotypes before me have but a single series in the mandible." I could believe the latter statement if I knew how carefully the cotypes were examined, but I am practically certain that Cope's observations are correct, since these teeth are difficult to observe, especially when only a low-power hand lens is used. When the lower jaw is dried a little, the teeth are obvious.

In substantiation of Cope's observation, I have found that all three species of *Characidium* collected by me have the two series of mandibular teeth and that they are somewhat prominent in the specimens from the Río Chama and the Río Torbes. No doubt all or at least many of the species now referred to the genus *Characidium*

will be found to possess the inner row of minute teeth along the bases of the outer row of larger teeth. I do not consider the number of scales below the lateral line as of generic significance, since I find them to vary from 2 to 5.

The genus *Characidium* may be split into two subgenera, however, on the presence or absence of scales on the breast. This character seems not to have been mentioned or else was overlooked by authors, and I am unable, because of lack of specimens, to determine if any of the generic names already proposed are available. Since *Characidium fasciatum* has a scaly breast, the group of species with scaly breasts and two rows of mandibular teeth must be referred to the genus *Characidium*. It is regretted that I lack material for a revision of this genus.

The following tentative key indicates some of the differences for the species of *Characidium* occurring in northern South America. It was prepared from the study of specimens in the National Museum and others lent by the California Academy of Sciences.

1*a*. Caudal fin with dark bars or with 1 or 2 oblique dark bands across each lobe.

2*a*. Caudal, dorsal, anal, and pelvic fins with about 4 dark cross bands; sides of body with about 7 dark bars, these reaching to midventral line posteriorly; breast scaly; dorsal rays iii,8 or iii,9; anal iii,6; pectoral iv,8 or iv,9; pelvic ii,6; scales 34 to 36, 4½ above and 3 below lateral line; 9 scales in front of dorsal; pelvic insertion closer to base of caudal than snout tip ..... **Characidium blennioides** Eigenmann

2*b*. Caudal, dorsal, and pectoral fins barred with spots; 6 or 7 dark bars on body from dorsal to lateral line; dorsal rays iii, 8; anal iii, 5 or 6; pectoral iii, 9; pelvic i, 6; scales 31 or 32, 3 above and 2 below lateral line. **Characidium declivirostre** Steindachner

2*c*. One or two oblique bars across each lobe of caudal fin.

3*a*. Each lobe of caudal fin with an oblique black bar; dorsal iii, 9; anal iii, 6; pectoral rays iv, 8 or iv, 9; pelvic ii, 6; black lateral band and another black band along back, the two connected by about 7 or 8 black bars; scales 36 or 37, 4 above and 2½ or 3 below lateral line, 9 or 10 scales in front of dorsal; breast scaly. (Adults.) **Characidium laterale** Eigenmann [17]

3*b*. Each caudal lobe with two oblique cross bands; dorsal rays iii, 9; anal iii, 6; pectoral iii, 9; pelvic i, 7; scales 35. **Characidium hasemani** Steindachner

1*b*. Caudal fin without blackish cross bands or bars or oblique dark bands.

4*a*. Sides of body with dark spots or with crescent-shaped dark spots, none being arranged to form definite bars on sides; back with narrow cross bars not continuous on sides; no blackish lateral band along sides; scales 36, 3 or 4 above and 2 or 2½ below lateral line; breast scaly.

5*a*. Middle of sides with 26 to 30 black spots, one or more out of line; back with 16 cross bars; dorsal rays iii, 9; anal iii, 6; 9 scales in front of

[17] An examination of a cotype specimen of *C. laterale*, Ind. Univ. No. 11673, and 4 cotypes of *C. vintoni*, Ind. Univ. No. 11674, shows ii, 6 pelvic rays and iv, 8 or 9 pectoral. This combination of two and four simple rays in the paired fins is not found in other species that I have examined except in *C. blennioides*, which likewise has ii,6 pelvic rays and iv,9 pectoral. It is concluded that *laterale* was based on the young and *vintoni* on the large adults. Thus *C. vintoni* becomes a synonym of *C. laterale*.

dorsal; pelvic insertion equal distance between snout and midcaudal base; 15 or 16 dark spots along lateral line.

Characidium pellucidum Eigenmann

5*b*. Sides with numerous small crescents of brown irregularly arranged; back with about 13 cross bars; dorsal rays iii, 9; anal iii, 5; pelvic insertion closer to tip of snout than midcaudal base.

Characidium pteroides Eigenmann

4*b*. Sides with a wide black band, not crossed with dark bars, through snout to caudal fin base; 2 or 3 more or less obsolete dark bars posteriorly; pectoral rays iv, 8 or 9; pelvic ii, 6; dorsal iii, 9 or 10; anal iii, 6; scales 36, 4 above and 2½ below lateral line; breast scaly. (Young.)

Characidium laterale Eigenmann

4*c*. Sides of body with 7 to 14 blackish vertical bars and black lateral band or streak present or absent, usually vertical bars less distinct on adults, especially during breeding season.

6*a*. Teeth conical without lateral points basally; breast scaly; centers of scales in black bars pale, especially so along back; dorsal rays iii, 8 or 9; anal iii, 6; scales 38, 4 above and 3 below lateral line, 10 scales in front of dorsal; about 10 bars on sides; no dark lateral band; pelvics inserted a little closer to tip of snout than midcaudal base.

Characidium catenatum Eigenmann

6*b*. Teeth with lateral points basally.

7*a*. Breast naked at all ages [18]; dorsal rays usually iii, 9; anal iii, 6; pectoral iii, 8 or iii, 9; pelvic insertion almost equidistant between tip of snout and midcaudal base; caudal spot at midbase of caudal fin, in young usual embedded cross bar at base of caudal fin; scales 30 to 33, 3½ above, 2½ or 3 below lateral line; 10 to 12 scales in front of dorsal; pelvic rays usually i, 8, rarely i, 9; 12 or 13 bars on sides becoming obsolete on breeding adults; shoulder spot blackish and prominent; usual black lateral streak represented by a narrow dark line or absent----------**Characidium voladorita**, new species

7*b*. Breast scaly, probably naked in young.

8*a*. Pectoral rays iii, 7 to iii, 9, very rarely iii, 10; dorsal usually iii, 9; pelvic i, 8.

9*a*. Pectoral rays iii, 7 to iii, 9; anal iii, 6; scales 32 to 36, 3½ to 4½ above and 3 or 3½ below lateral line; 10 or 11 scales in front of dorsal; 11 dark bars on sides with 3 or 4 of these between dorsal fins; pelvics inserted closer to tip of snout than midcaudal fin base----------**Characidium fasciatum** Reinhardt

9*b*. Pectoral rays iii, 8 or iii, 9; anal iii, 7; scales 34, 5 above and 3 below lateral line, with 9 in front of dorsal fin; about 10 dark cross bars, 3 of these between dorsal fins; pelvics equal distance between tip of snout and midcaudal fin base.

Characidium zebra Eigenmann [19]

9*c*. Pectoral rays iii, 8 to iii, 10, usually iii, 9; anal iii, 6 or 7; scales 31 to 35; 9 or 10 dark bars on sides with 3 of these between dorsals; pelvics inserted a little closer to midcaudal base than tip of snout.

Characidium marshi Breder

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[18] Several other species of *Characidium* no doubt have naked breasts, but I have not been able to study this important character because specimens of various species are not available.

[19] A cotype, Indiana Univ. No. 11687, lent me by the California Academy of Sciences, shows distinct relationships with *C. fasciadorsale* Fowler (Proc. Acad. Nat. Sci. Philadelphia, vol. 66, p. 233, 1914, Rupununi River, Brit. Guiana), which I consider a synonym of *C. zebra*.

9*d*. Pectoral rays iii, 8 to iii, 9, rarely iii, 10; anal iii, 6 or 7; scales 32 to 35, 3 to 4½ above and 3 below lateral line, with 10 to 12 in front of dorsal fin; 12 to 14 dark bars on sides or sometimes a few are combined, leaving 8 or 9; 3 to 5 of these bars between dorsal fins; immature with black lateral stripe and black spot near center of base of caudal fin; pelvics inserted a little closer to tip of snout than midcaudal base.

Characidium caucanum Eigenmann [20]

8*b*. Pectoral rays ii, 11 or 12; dorsal iii, 9 or 10; anal iii, 7 or 8; pelvic i, 8 or 9; scales 33 to 37, with 4½ or 5 above and 3 or 4 below lateral line; 11 to 13 scales in front of dorsal fin; gill rakers on first gill arch 6 or 7+9 or 10; 9 or 10 dark cross bars on sides and a dark lateral band; basal third of caudal fin brownish in adults.

10*a*. Black cross bars on half-grown and many adults ending abruptly in black lateral streak as enlarged round black spots, in others the bars faint, especially on breeding females; scales 33 to 36.

Characidium chupa chupa, new species and subspecies

10*b*. Black cross bars usually extending a little below the blackish lateral band and not intensified into round black blotches; scales 35 to 37.

Characidium chupa torbesensis, new subspecies

CHARACIDIUM BLENNIOIDES Eigenmann

Characidium blennioides Eigenmann, Ann. Carnegie Mus., vol 6, No. 1, p. 37, 1909 (Erukin, tributary to Potaro above Kangaruma; Tukeit; creek above Potaro Landing; Tumatumari; Crab Falls; Amatuk).

Through the courtesy of J. T. Nichols, American Museum of Natural History, I was able to examine 5 specimens that probably belong to this species. They were collected at Mount Duida, Venezuela.

CHARACIDIUM DECLIVIROSTRE Steindachner

Characidium declivirostre Steindachner, Denkschr. Akad. Wiss. Wien, vol. 93, p. 31, 1917 (Río Coquenan, tributary to Río Caroni, in Venezuela).

CHARACIDIUM CATENATUM Eigenmann

Characidium catenatum Eigenmann, Ann. Carnegie Mus., vol. 6, No. 1, p. 40, 1909 (Warraputa; Rockstone sandbank; Crab Falls, all British Guiana); Indiana Univ. Stud., vol. 7, No. 44, p. 10, 1920 (Río Guaire near Caracas; Río Tuy, Concejo, Venezuela).

I have examined two of Eigenmann's specimens, Ind. Univ. No. 15142, collected by Pearse in the Río Guaire, and find very small lateral points basally on some of the teeth. Through the courtesy of J. T. Nichols, American Museum of Natural History, I examined two specimens of this species from Mount Duida, Venezuela.

[20] *C. caucanum* (paratype, U. S. N. M. No. 79183) and *C. phoxocephalum* (cotype, Ind. Univ. No.12704) have been studied; also additional specimens (U. S. N. M. Nos. 120144, 120145, 120146 and 120209). From this series it is concluded that the coloration is variable, as the young and half grown have vertical bars that disappear on adults, usually completely lacking on mature females. The number of scales is variable, 32 to 35. Thus, I conclude that *phoxocephalum* is a synonym of *caucanum*.

CHARACIDIUM VOLADORITA, new species

FIGURE 32

Holotype.—U. S. N. M. No. 121407, a specimen 40.5 mm. in standard length collected by Leonard P. Schultz, 4 km. above Motatán in the Río Motatán, Maracaibo Basin, March 25, 1942.

Paratypes.—All the paratypes listed below were collected by Leonard P. Schultz in the Maracaibo Basin of Venezuela during 1942.

U.S.N.M. No. 121408, 40 specimens, 28 to 41 mm. in standard length, taken along with the holotype and bearing same data.

U.S.N.M. No. 121412, 10 examples, 25 to 36 mm., from the Río Motatán, 8 km. below Motatán, March 24.

U.S.N.M. No. 121414, 98 examples, 20 to 34 mm., from the Río San Juan near the bridge south of Mene Grande, Motatán system, March 17 and 20.

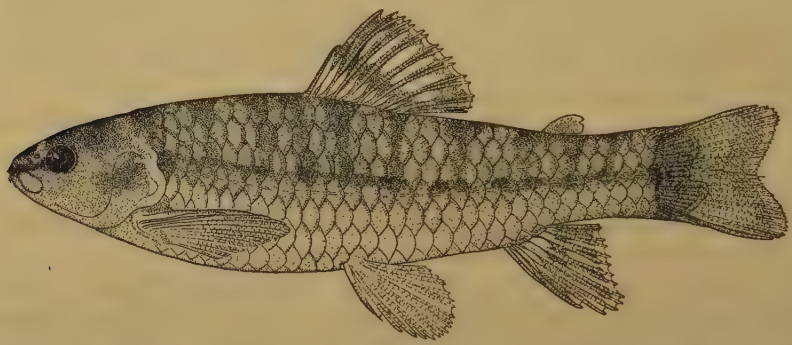

FIGURE 32.—*Characidium voladorita*, new species: Holotype, U.S.N.M. No. 121407, 40.5 mm. in standard length.

U.S.N.M. No. 121410, 27 specimens, 20 to 34 mm., from the Río San Pedro at bridge, south of Mene Grande, Motatán system, March 20.

U.S.N.M. No. 121413, 26 specimens, 18 to 26 mm., from the Río San Juan, 12 km. south of Rosario, Estado de Zulia, February 26.

U.S.N.M. No. 121409, 15 examples, 23 to 32 mm., from the Río Palmar near Totuma, about 100 km. southwest of Maracaibo, February 21.

U.S.N.M. No. 121411, 3 specimens, 24 to 32 mm., from the Río Machango, 20 km. above bridge south of Lagunillas, March 21.

This species was abundant in swiftly flowing water among rubble and gravel. It darts swiftly from place to place on the stream bottom and resembles in habit the darters of North America.

Description.—Detailed measurements were made on the holotype and one paratype, and these data, expressed in hundredths of the standard length, are recorded first for the holotype, then for the paratype in parentheses. Standard lengths in mm. 40.5 (35.1).

Length of head 25.7 (25.9); greatest depth of body 27.2 (22.5); diameter of eye 4.94 (4.84); length of snout 6.18 (6.25); length of maxillaries 6.18 (5.98); postorbital length of head 15.6 (15.7); width of interorbital space 5.68 (4.84); least preorbital width 2.46 (2.85);

least depth of caudal peduncle 13.3 (11.7); length of caudal peduncle from base of last anal ray to midbase of caudal fin 19.0 (22.2); distance from tip of snout to dorsal origin 48.2 (46.4); snout to adipose origin 84.0 (80.9); snout to anal origin 78.0 (74.0); snout to pectoral insertion 21.0 (21.4); snout to pelvic insertion 54.1 (50.2); snout to anus 68.6 (65.5); length of longest ray of dorsal fin 18.5 (17.1); longest ray of anal fin 18.0 (17.4); longest ray of pectoral fins 23.0 (24.2); longest ray of pelvic fins 19.0 (20.5); longest ray of upper caudal lobe 20.0 (21.4) and of lower caudal lobe 21.5 (21.4).

The following counts were made, respectively: Dorsal rays iii, 8 (iii, 9); anal iii, 6 (iii, 6); pectoral iii, 9—iii, 9 (iii, 8—iii, 8); pelvic i, 7—i, 7 (i, 7—i, 7); gill rakers on first gill arch – – (5+10); number of scale rows from dorsal edge of gill opening to midcaudal base 32 (32); scales from dorsal base to lateral line 3½ (3½) and from lateral line to pelvic base 3 (2½); scales in front of dorsal fin 12 (11); additional counts are recorded in table 11.

This is a small species, the largest specimen being 41 mm. in standard length, and among the various lots are numerous females with fully developed eggs which cause their bodies to be greatly expanded.

Greatest depth 3.8 (females with developed eggs) to 4.5 in immature; head 3.6 to 4.0; eye equal to or a little smaller than snout; maxillary not quite extending to a vertical line through front of eye; least preorbital width about 1.8 in interorbital space, the latter equal to the eye in the largest and contained 1.6 in the eye of the immature; pelvic insertion equidistant between or a little closer to base of caudal than to tip of snout; dorsal origin equidistant between adipose origin and anterior two-thirds of eye; 6 or 7 teeth, in outer row on each side of lower jaw, the middle 3 or 4 considerable larger than the lateral 3, the former directed forward, and a second inner row of minute teeth projecting at nearly right angles from near bases of outer row of larger teeth; all teeth with a minute denticle near base on each side; each premaxillary with 6 teeth; first 4 outer rays of pectoral fin thickened and sometimes the tips of the fifth in all adults, but in the immature none of the fin rays thickened; outer 2 pelvic rays thickened in adults; simple rays of both anal and dorsal thickened and sometimes the tips of the first branched ray; the short-pointed gill rakers well developed; gill membranes free and continued far forward before joining with the narrow isthmus; breast naked, no scales between bases of pectoral fins even in breeding adults; adipose fin small, its base over bases of last one or two anal rays or just behind a vertical through posterior end of anal fin base; origin of pelvics under the bases of about the second or third branched dorsal rays; caudal peduncle compressed; caudal fin forked, the lobes nearly equal; distal margin of dorsal fin truncate or a little rounded, that of anal truncate or a little concave in breeding males; second or third branched ray of pectoral longest, the third branched

pelvic ray longest; lateral line complete but not prominent, slightly decurved anteriorly and running just below blackish lateral streak except along caudal peduncle where it is along the midaxis; bases of first rays of dorsal and anal fins provided with free membranous folds; a small axillary scale on upper base of pelvics.

Coloration of breeding males when alive was as follows: Head blackish, a little paler below, iris blackish except a narrow bright line posteriorly next to pupil; a blackish bar across operculum, followed by bright yellow across rear of opercle to in front of pelvic base, this yellow bar extending dorsally to above operculum and fainter to occiput, and set off posteriorly by the blackish humeral bar; basal part of pectoral fin yellowish; upper and anterior parts of body brownish black, gradually becoming purplish brown posteriorly; a bright yellow spot at anterior basal half of first dorsal rays, then a brown bar across middle of fin, distal half of dorsal purplish; anterior basal third of anal fin with a bright yellow spot, the distal half brown; adipose fin purplish; caudal fin brownish, the basal third abruptly darker brown; along the lateral axis on midsides is an irregular or broken dark streak anteriorly, becoming a succession of black dots posteriorly.

The color pattern of the females and of the immature in alcohol consists of about 9 or 10 dark vertical bars on sides, meeting along middorsal line, these most prominent in the immature; a small black spot at midbase of caudal fin; in front of this an embedded blackish bar across base of caudal fin rays that sends off a narrow line of pigment along the outer caudal fin ray; dorsal with one or two brownish bars across the rays, other fins plain in color; humeral spot always blackish and prominent; pale areas at anterior basal third of both dorsal and anal fins; the dark lateral streak narrow, usually formed by a row of small black spots posteriorly on breeding females.

These little fishes are beautifully colored when alive and live among the gravel and stones on the stream bottom much as do the darters of eastern North America.

Remarks.—This new species of *Characidium* with no scales on its breast differs in other respects from all other members of the genus in its color pattern. By means of the key on page 278, it may be separated from other species occurring in northern South America.

Named *voladorita* in reference to its small size and to the common name given it by the Venezuelans who saw me collect this species.

CHARACIDIUM FASCIATUM Reinhardt

Characidium fasciatum Reinhardt, Overs. Danske Vid. Selsk. Forh. Kjøbenhavn, 1866, p. 56, pl. 2, figs. 1, 2 (Lagoa Santa; Rio das Velhas, Brazil).—Steindachner, Denkschr. Akad. Wiss. Wien, vol. 41, p. 155, 1879 (Ciudad Bolívar, Venezuela).—Eigenmann, Mem. Carnegie Mus., vol. 9, No. 1, p. 121, 1922 (Orinoco).—Eigenmann and Allen, Fishes of western South America, p. 288, 1942 (Orinoco Basin).

U.S.N.M. No. 121405, 2 specimens, 26.5 and 27.5 mm. in standard length, collected by L. P. Schultz, G. Zuloaga, William Phelps, Jr., and Roger Sherman, May 12, 1942, in the Río Guárico and tributaries between San Sebastián and San Casimiro, Estado de Aragua.

It is highly probable that the above specimens and others from the Orinoco system, here identified as this species, are really a distinct subspecies. They usually have iii, 9 pectoral rays instead of iii, 8, as counted in two of Lütken's specimens and Reinhardt's count.

CHARACIDIUM CHUPA CHUPA, new species and subspecies

CHUPA

FIGURE 33

Holotype.—U.S.N.M. No. 121417, a female specimen 66.5 mm. in standard length, with fully matured eggs, collected by Leonard P.

FIGURE 33.—*Characidium chupa chupa,* new species and subspecies: Holotype, U.S.N.M. No. 121417, 66.5 mm. in standard length.

Schultz, April 3, 1942, in the Río Chama at Estanques, Estado de Mérida.

Paratypes.—All collected by Leonard P. Schultz during 1942:

U.S.N.M. No. 121419, 80 specimens, 35 to 80 mm. in standard length, taken along with the holotype and bearing same data.

U.S.N.M. No. 121418, a specimen, 75 mm., from the Río Chama 10 km. below Lagunillas, Estado de Mérida, March 30.

U.S.N.M. No. 121420, 9 examples, 32 to 63 mm., from the Río Chama at La Gonzáles, Estado de Mérida, March 29.

This species lives in swiftly flowing streams among stones and pools among the rocks.

Description.—Detailed measurements were made on the holotype and one paratype, and these data, expressed in hundredths of the standard length, are recorded first for the holotype, then for the paratype in parentheses. Standard lengths in mm. 66.5 (♂39.5).

578625—44——4

TABLE 11.—*Counts made on species of* Characidium

Species	Number of fin rays																	Number of gill rakers on first gill arch					
	Dorsal			Anal			Pectoral								Pelvic				Above angle			Below angle		
	iii, 8	iii, 9	iii, 10	iii, 6	iii, 7	iii, 8	iii, 7	iii, 8	iii, 9	iii, 10	iii, 11	iii, 12	iv, 8	iv, 9	i, 7	i, 8	i, 9	ii,6	5	6	7	8	9	10
chupa chupa	---	13	---	---	12	1	---	---	---	---	14	11	---	---	---	16	4	---	3	2	1	2	3	1
chupa torbesensis	---	6	2	---	7	1	---	---	---	---	7	9	---	---	---	9	3	---	---	---	2	---	1	1
voladorita	1	10	1	10	---	---	---	4	17	---	---	---	---	---	19	2	---	---	1	2	---	2	1	---
caucanum [1]	---	9	---	3	7	---	---	3	8	4	1	---	---	---	---	12	---	---	1	1	---	1	1	---
fasciatum [2]	---	3	---	3	---	---	2	4	---	---	---	---	---	---	---	4	---	---	---	---	---	---	---	---
laterale [3]	---	2	---	2	---	---	---	---	---	---	---	---	6	2	---	---	---	10	---	---	---	---	---	---
blennioides [4]	1	---	---	1	---	---	---	---	---	---	---	---	---	2	---	---	---	2	---	---	---	---	---	---

[1] U. S. N. M. Nos. 79183, 120146, 120145, 120144, and 120209 and Ind. Univ. No. 12704.
[2] U. S. N. M. Nos. 44950 and Lütken's figure.
[3] Indiana Univ. Nos. 11674 and 11673, cotypes of *vintoni* and *laterale*, respectively.
U. S. N. M. No. 66129, cotype of *blennioides*.

Species	Number of scales																						
	Rows crossing lateral line								Above lateral line					Below lateral line				In front of dorsal fin					
	30	31	32	33	34	35	36	37	3	3½	4	4½	5	2½	3	3½	4	9	10	11	12	13
chupa chupa	---	---	---	2	4	5	4	---	---	---	---	4	5	---	7	---	2	---	---	4	2	1
chupa torbesensis	---	---	---	---	---	1	4	3	---	---	---	5	1	---	5	---	1	---	---	---	4	1
voladorita	1	1	6	2	---	---	---	---	---	7	---	---	---	8	---	---	---	---	---	5	3	1	---
caucanum	---	---	2	3	1	2	---	---	2	1	3	1	---	---	7	---	---	---	---	2	3	2	---
fasciatum	---	---	---	1	1	---	1	---	---	1	1	1	---	---	---	---	3	---	---	---	2	---	---
laterale	---	---	---	---	---	1	1	---	---	---	1	---	---	---	2	---	---	---	---	1	---	---	---
blennioides	---	---	---	---	1	---	---	---	---	---	---	1	---	---	1	---	---	1	---	---	---	---	---

Length of head 26.9 (25.8); greatest depth of body 28.4 (23.8); diameter of eye 5.41 (6.32); length of snout 7.82 (7.34); length of maxillaries 7.06 (6.54); postorbital length of head 16.2 (16.7); width of interorbital space 6.01 (6.54); least preorbital width 2.56 (2.28); least depth of caudal peduncle 12.5 (12.9); length of caudal peduncle from base of last anal ray to midbase of caudal fin 16.8 (19.0); distance from tip of snout to dorsal origin 46.3 (47.0); snout to adipose origin 83.2 (83.5); snout to anal origin 79.0 (77.2); snout to pectoral insertion 22.0 (25.6); snout to pelvic insertion 56.2 (54.4); snout to anus 73.0 (71.9); length of longest ray of dorsal fin 18.9 (21.3); longest ray of anal fin 17.4 (19.5); longest ray of pectoral fin 25.7 (25.8); longest ray of pelvic fin 21.2 (22.8); longest ray of upper caudal lobe 23.6 (26.6) and of lower caudal lobe 24.5 (26.6).

The following counts were made, respectively, on the holotype and paratype: Dorsal rays iii, 9 (iii, 9); anal iii, 7 (iii, 7); pectoral iii,

12–iii, 12 (iii, 11–iii, 11); pelvic i, 8–ii, 7 [this is an abnormal condition] (i, 9–i, 9); gill rakers on first gill arch – – (6+10); number of scale rows from dorsal edge of gill opening to midcaudal base 34 (34); scales from dorsal base to lateral line 5 (5) and from lateral line to pelvic base 4 (3); scales in front of dorsal fin 12 (11). Additional counts are recorded in table 11.

This species reaches a maximum length of about 80 mm. in standard length, and the April 3 collection contains numerous females with their abdomens greatly distended with mature eggs.

Greatest depth 3.5 (in females with eggs) to 4.0; head 3.4 to 3.7 in standard length; eye a little smaller than length of snout; eye 1 1/5 in interorbital, the latter a little convex; least preorbital width 2 times in the interorbital; posterior edge of maxillary reaching to a vertical through front of eye; pelvic insertion closer to midcaudal base than tip of snout; dorsal origin equidistant between adipose origin and eye; teeth in lower jaw in an outer row on each side numbering about 14 or 15, the inner 4 or 5 of these a little enlarged, then an inner row of minute teeth on the lower jaw a little distance inside of the outer row; 6 or 7 teeth on each premaxillary in a single row, no inner row; all teeth with a minute denticle near base on each side; first 4 outer pectoral rays thickened and sometimes tips of the fifth; first outer two pelvic rays thickened and sometimes tips of the third; third branched ray of pectorals longest, second or third ray of pelvics longest; simple rays of both anal and dorsal thickened in adults and sometimes the tips of the first branched ray; gill rakers short, pointed, gill membranes continued forward and free from the isthmus; breast scaly; adipose fin small, its origin over bases of last 1 or 2 anal rays; insertion of pelvics under about the fourth branched dorsal ray; caudal peduncle compressed, caudal fin forked, the lobes nearly equal; distal margin of dorsal fin truncate, that of anal fin truncate; lateral line complete but difficult to observe as the pores and tubes are more or less obsolete, slightly decurved anteriorly; basal third of first rays of dorsal and anal fin provided with free membranous folds; pelvics with small axillary scale.

Coloration of a breeding female when alive was as follows: General background color pale yellowish with three bright-yellow spots on side of head, one at upper edge of gill opening, one on opercle near tip, and the third on rear of preopercle, in front of which is an oblique brownish bar; upper part of operculum with brown blotch; dorsal fin pale yellowish orange, this crossed by two faint darkish bars; basal half of anal yellowish, distal part pale brownish; caudal fin light brownish; a brownish bar across distal portion of pectoral rays, the basal third yellowish; sides of body with numerous wavy short vertical blackish bars.

In alcohol the color pattern is somewhat variable with sex and age. The immature have about nine vertical color bars that end in an enlarged round spot along the midaxis of the body; also along the midaxis is a black band; humeral spot black and prominent; base of caudal fin with a black blotch that continues part way out along the middle rays of caudal fin; coming off the black caudal spot at base of caudal fin rays are short wings, one dorsally and the other ventrally, and these then continue as faint pigment streaks along outer rays of caudal fin; a black streak through eye to tip of snout.

The adults are similar in color pattern, but the bars and black lateral band are less distinct; the vertical color bars do not continue below the lateral line or below their enlarged ends along midaxis; the dark brown color on the basal half of the caudal fin abruptly ends, so that the distal half of the caudal fin is pale; behind the base of each of the middle caudal fin rays is a small black spot.

Remarks.—This new species differs from other species referred to *Characidium* in color pattern and in the more numerous pectoral rays, iii, 11 or iii, 12 instead of iii, 10 or fewer.

Named *chupa* after the common name of this species as given to me by the Venezuelans of the valley of the Río Chama.

CHARACIDIUM CHUPA TORBESENSIS, new subspecies

FIGURE 34

Holotype.—U.S.N.M. No. 121415, a specimen 61 mm. in standard length, collected by Leonard P. Schultz, March 31, 1942, in the Río Torbes, 1 km. above Táriba, Orinoco drainage.

Paratypes.—U.S.N.M. No. 121416, 7 specimens, 52 to 76 mm., collected along with the holotype and bearing same data. These types were collected in rapidly flowing water among rubble to large boulders.

Description.—Detailed measurements were made on the holotype and one paratype, and these data, expressed in hundredths of the standard length, are recorded first for the holotype then the paratype in parentheses. Standard lengths in mm. 61 (70.5).

Length of head 25.6 (27.6); greatest depth of body 26.5 (31.2); diameter of eye 5.57 (4.96); length of snout 5.90 (6.67); length of maxillaries 6.56 (6.38); postorbital length of head 16.4 (17.9); width of interorbital space 6.06 (6.52); least preorbital width 1.66 (2.83); least depth of caudal peduncle 12.8 (14.0); length of caudal peduncle from base of last anal ray to midbase of caudal fin 18.5 (19.1); distance from tip of snout to dorsal origin 45.7 (49.8); snout to adipose origin 82.8 (84.4); snout to anal origin 76.2 (76.6); snout to pectoral insertion 20.8 (23.1); snout to pelvic insertion 52.0 (56.6); snout to anus 69.0 (71.5); length of longest ray of dorsal fin 18.8 (19.1); longest ray of

anal fin 17.0 (18.4); longest ray of pectoral fin 25.6 (24.8); longest ray of pelvic fin 20.0 (21.3); longest ray of upper caudal lobe 25.1 (25.2) and of lower caudal lobe 26.6 (26.2).

The following counts were made, respectively: Dorsal rays iii, 9 (iii, 9); anal iii, 7 (iii, 7); pectoral iii, 12–iii, 12 (iii, 11–iii, 11); pelvic i, 8–i, 9 (i, 8–i, 8); gill rakers on first gill arch 7+9 (7+10); number of scale rows from dorsal edge of gill opening to midcaudal base 35 (36); scales from dorsal base to lateral line 4½ (4½) and from lateral line to pelvic base 3 (3½); scales in front of dorsal fin 12 (11); additional counts are recorded in table 11.

FIGURE 34.—*Characidium chupa torbesensis*, new subspecies: Holotype, U.S.N.M. No. 121415, 61 mm. in standard length.

Remarks.—This subspecies, *Characidium chupa torbesensis*, of the Río Torbes, is essentially like the one in the Río Chama, *Characidium chupa chupa*, except for color pattern and certain statistical differences of doubtful significance (see table 11). There appears to be a slightly greater average number of scales in the lateral line in *torbesensis* and a trifle higher average number of pectoral fin rays. The color bars extend below the blackish lateral band in *C. c. torbesensis* and are not enlarged into round blotches along the midaxis as in *C. chupa chupa*.

Named *torbesensis* after the river from which it was collected.

Subfamily PARODONTINAE

VOLADORAS

A study of this group of fishes indicates considerable confusion in regard to the definition of the species and their separation. An attempt was made by Schultz and Miles (Journ. Washington Acad. Sci., vol. 33, No. 8, pp. 251–255, figs. 1, 2, 1943) to distinguish the genera by the key given below, but material for a revision of the species is inadequate, and about all I am able to contribute at this time in

helping clear up this matter is a redescription of *Parodon suborbitale* and the form collected by me in the Orinoco Basin, along with other data obtained on specimens in the National Museum.

KEY TO THE GENERA OF PARODONTINAE

1*a*. Teeth in upper jaw 0+6+0 and not in a straight line; edge of thin upper lip free and crossing middle of teeth on premaxillaries; no teeth in lower jaw, the edge of which is 5-lobed; pectoral rays ii, 12 to 16; pelvics i, 8.
Saccodon Kner and Steindachner

1*b*. Teeth in upper jaw normally 2+8+2 (2 teeth on each maxillary); upper lip not free but forming part of flesh between bases of teeth on premaxillaries.

2*a*. Pectoral rays ii, 14 to 17; pelvics i, 8; no teeth on lower jaw.
Parodontops Schultz and Miles

2*b*. Pectoral fin rays i, 11 to 16; pelvics i, 7, rarely i, 8.

3*a*. No teeth on lower jaw---------- **Apareiodon** Eigenmann

3*b*. Teeth at sides of lower jaw normally 3+3, but one or more may be lacking in young---------- **Parodon** Valenciennes

Genus PARODON Valenciennes

Parodon VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 22, p. 50, 1849. (Type: *Parodon suborbitale* Valenciennes.)

TENTATIVE KEY TO THE SPECIES OF PARODON REPORTED FROM VENEZUELA

1*a*. Color pattern consisting of about 13 to 15 vertical blackish color bars on sides, their width narrower than eye; pale interspaces a little narrower than black bars; each pair (usually with one or two exceptions) of these black vertical color bars more or less fuse to form a black saddle across back that meets the corresponding pair on other side, the back thus being crossed with about 9 saddles; no lengthwise black streaks, even along lateral line or on back; origin of dorsal closer to tip of snout than midbase of caudal fin by length of snout and eye; pectoral fin rays i, 14 to i, 16, usually i, 15; dorsal ii, 10; anal ii, 7; pelvic i, 7; scales 35 to 38, usually 36 or 37, with 4 or 4½ above lateral line to origin of dorsal and 4 below lateral line to origin of anal fin; 16 scales in a zigzag row around caudal peduncle; 11½ to 12½ predorsal scales and 11½ to 12½ scales between base of dorsal fin and adipose origin; head 4 to 5⅓, depth 3⅓ to 4, in standard length; least depth of caudal peduncle 1.4 to 1.6 in head.
Parodon apolinari Myers

1*b*. Color pattern consisting of a lateral streak, a little intensified at base of caudal fin and continuing nearly to end of midcaudal rays; this lateral streak or band, diffuse in adults, more intense in young about 60 mm. or shorter, crossed with about 18 or 19 very short blackish bars; about 8 or 9 dark saddles across back, diffuse in largest specimens; in other specimens bars lacking and lateral band intensified and in addition a narrow black streak, well defined, extending along upper sides to behind adipose fin where it joins its fellow from the other side, this band separated from lateral band by a wide pale band, crossed by the 8 or 9 dark diffuse dorsal saddles; dorsal fin closer to tip of snout by snout and eye than to midbase of caudal fin; pectoral rays i, 13 to i, 15, usually i, 14; dorsal ii, 10; anal ii, 7; pelvic i, 7; scales 36 or 37 in lateral line to base of caudal, 4½ above and 4

below lateral line; 15 or 16, usually 16 scales in zigzag row around caudal peduncle; 11½ to 13 predorsal scales and 11 to 12½ between base of dorsal and adipose origin; head about 4½, depth 3½ to 3⅝, in standard length; least depth of caudal peduncle 1.6 in head.

Parodon suborbitale Valenciennes

PARODON APOLINARI Myers

Parodon apolinari Myers, Proc. Biol. Soc. Washington, vol. 43, p. 66, 1930 (Guaicaramo, Río Guavio, Colombia); Stanford Ichth. Bull., vol. 2, p. 93, 1942 (Río Guárico, at El Sombrero, Guárico, Venezuela).

The following specimens were collected in Venezuela during 1942:

U.S.N.M. No. 121298, 7 specimens, 45.5 to 85 mm. in standard length from the Río Guárico and tributaries between San Sebastián and San Casimiro on May 12, by L. P. Schultz, G. Zuloaga, Roger Sherman, and William Phelps, Jr.

U.S.N.M. No. 121296, a specimen, 120.5 mm., collected by Leonard P. Schultz, March 31, in the Río Torbes, 1 km. above Táriba, Táchira, Orinoco Basin.

These fish, living in the swift waters of mountain streams, are difficult to capture. Upon the slightest disturbance, they dart among the stones and hide.

See table 12 for measurements of this and the next species.

PARODON SUBORBITALE Valenciennes [21]

Voladora

Figure 35

Parodon suborbitale Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 22, p. 51, pl. 637, 1849 (rivers of Maracaibo).

Parodon suborbitalis Günther, Catalogue of the fishes in the British Museum, vol. 5, p. 301, 1864 (Maracaibo).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 49, 1891 (Maracaibo).—Eigenmann, Mem. Carnegie Mus., vol. 9, p. 108, pl. 19 fig. 1, 1922 (Maracaibo).

The following specimens were collected by Leonard P. Schultz in the Maracaibo Basin during 1942:

U.S.N.M. No. 121295, 4 specimens, 60.5 to 107 mm. in standard length, Río Jimelles, 12 km. east of Motatán, Río Motatán System, March 24.

U.S.N.M. No. 121293, 3 specimens, 76.5 to 108 mm., Río Motatán, 4 km. above Motatán, March 25.

U.S.N.M. No. 121294, 1 specimen, 70.5 mm., Río San Pedro at bridge south of Mene Grande, Motatán System, March 20.

U.S.N.M. No. 121292, 1 example, 97.5 mm., Río San Juan at bridge south of Mene Grande, Motatán System, March 20.

U.S.N.M. No. 121346, 1 example, 42 mm., Río Palmar near Totuma, about 100 km. southwest of Maracaibo, February 21.

[21] Steindachner, Denkschr. Akad. Wiss. Wien, vol. 93, p. 25, pl. 5, fig. 1, 1917, records *Parodon tortuosus* Eigenmann and Norris from the Río Coquenan in Venezuela. His figure does not agree with his measurements in the table on page 27, especially in regard to the origin of the dorsal fin. Probably the specimen from the Río Coquenan is *suborbitale* or a subspecies of it.

TABLE 12.—*Measurements, expressed in hundredths of the standard length, made on two species of* Parodon *from Venezuela*

Characters	*suborbitale*		*apolinari*	
	Río San Juan	Río San Pedro	Río Torbes	Río Guárico
Standard length in millimeters	97.7	71.0	120.5	85
Length of head	23.0	23.1	25.3	21.2
Greatest depth	28.0	28.9	29.1	29.4
Diameter of eye	4.40	5.21	3.73	4.12
Length of snout	9.00	8.59	9.12	8.24
Interorbital space	9.31	9.44	9.95	8.82
Postorbital length of head	11.2	11.4	14.1	10.6
Least depth of caudal peduncle	15.1	14.2	14.1	13.5
Length of caudal peduncle	16.4	19.0	16.3	17.1
Space between nasal openings	6.24	4.93	6.60	5.06
Snout to dorsal origin	46.8	45.0	49.4	48.6
Snout to adipose origin	83.9	83.0	85.2	84.2
Snout to anal origin	76.8	78.3	72.6	76.5
Snout to pectoral insertion	20.0	19.9	21.1	16.9
Snout to pelvic insertion	50.6	48.2	54.8	51.2
Length of longest ray of dorsal fin	22.8	20.0	20.2	20.8
Length of longest ray of anal fin	17.7	16.6	18.2	17.1
Length of longest ray of pectoral fin	22.0	19.0	17.8	17.6
Length of longest ray of pelvic fin	18.4	17.6	19.1	17.6
Length of longest ray of upper caudal lobe	26.6	25.8	24.0	24.1
Length of longest ray of lower caudal lobe	26.7	24.0	25.7	24.1
Snout to anus	68.1	70.4	74.0	70.8
Anus to anal origin	8.19	7.32	6.72	6.60
Width across lower jaw	5.73	4.65	5.81	4.97
Dorsal base to adipose origin	28.6	28.3	27.8	24.9

The coloration varies from nearly plain darkish above, paler below, to one with two blackish lateral bands on each side and 8 or 9 dark

FIGURE 35.—*Parodon suborbitale* Valenciennes: U.S.N.M. No. 121295, 105 mm. in standard length.

saddles across the back. In addition, small specimens have very short vertical bars along the lateral band. When alive, there were two irregular rows of yellow-orange spots along the midsides separated by a series of dark, irregular short cross bars or "parr marks" along

the darkish lateral band; ground color above purplish brown. Thus it must be concluded that the type of the genus *Parodon* is variable in color and that several of the species which have been described on the basis of black streaks or bands as differing from *suborbitale* need careful study and perhaps they should be placed in the synonymy of *suborbitale*. I especially refer to *Parodon bifasciatus* Eigenmann, *P. buckleyi* Boulenger, and *P. carrikeri* Fowler. Probably there are others.

Much of the confusion in separation of the species of *Parodon* has resulted in the almost complete lack of comparative material from the Maracaibo Basin since Cuvier and Valenciennes's time until now.

Genus HEMIODUS Müller

Hemiodus Müller, Monatsb. Akad. Wiss. Berlin, 1842, p. 324. (Type, *Hemiodus crenidens* Müller=*Salmo unimaculatus* Bloch.) (Ref. copied.)

HEMIODUS IMMACULATUS Kner

Hemiodus immaculatus Kner, Denkschr. Akad. Wiss. Wien, vol. 17, p. 157, pl. 5, fig. 9, 1859 (Barra do Rio Negro).—Steindachner, Denkschr. Akad. Wiss. Wien, vol. 41, p. 153, 1879 (Ciudad Bolívar).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 49, 1891 (Orinoco).

No black lateral spot but a dark band along each caudal lobe; upper jaw with 22 teeth in horseshoe-shaped row; dorsal rays ii, 9; anal ii, 10; pelvic i, 11; pectoral i, 17; scales 10 or 11+70 to 72+6 or 7.

Genus PIABUCINA Valenciennes

Piabucina Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 22, p. 161, 1849. (Type, *Piabucina erythrinoides* Valenciennes.)

In the absence of specimens of *Piabucina* from the rivers draining the western slopes of Lago Maracaibo Basin, it appears necessary to recognize two species, the first described by Valenciennes in 1849 and the second by Regan in 1903. I regret that I was unable to collect *Piabucina* in the streams flowing down from the Perijá region, the type locality of *P. erythrinoides* Valenciennes.

KEY TO THE SPECIES OF PIABUCINA REPORTED FROM VENEZUELA

1*a*. Scales 37; 9 scales between pelvic insertion and base of dorsal fin; dorsal rays 10; anal 12; pectoral 16; pelvic 8; origin of dorsal equal distance between base of caudal and tip of snout; depth 5, head 4⅘ in standard length; black caudal spot not round, its greatest length through vertical axis (after Valenciennes)----------**Piabucina erythrinoides** Valenciennes

1*b*. Scales 30 to 32, 7½ scales from insertion of pelvics to base of dorsal fin; dorsal rays usually ii, 8; anal ii, 8 or ii, 9; pectoral i, 13, pelvic i, 7; origin of dorsal equal distance between base of caudal fin and eye; depth 4 to 4⅘, head 4 to 4⅓ in standard length; black caudal spot nearly round; dorsal fin with the black spot at base between first four branched rays of dorsal. **Piabucina pleurotaenia** Regan

PIABUCINA ERYTHRINOIDES Valenciennes

Piabucina erythrinoides VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 22, p. 161, 1849 (rivers of Maracaibo, coast of "Parija").—GÜNTHER, Catalogue of the fishes in the British Museum, vol. 5, p. 311 1864 (Maracaibo).—EIGENMANN and EIGENMANN, Proc. U. S. Nat. Mus., vol. 14, p. 52, 1891 (Maracaibo).—EIGENMANN, Mem. Carnegie Mus., vol. 9, No. 1, p. 125, 1922 (Maracaibo).

PIABUCINA PLEUROTAENIA Regan

VOLADORA

FIGURE 36

Piabucina pleurotaenia REGAN, Ann. Mag. Nat. Hist., ser. 7, vol. 12, p. 623, 1903 (Mérida, Venezuela).

The following specimens were collected by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121403, 2 specimens, 108 and 124 mm. in standard length, from the Río San Juan near bridge, tributary to Río Motatán, March 20.

U.S.N.M. No. 121402, 1 specimen, 79 mm., from the Río San Pedro at bridge, Motatán system, March 20.

U.S.N.M. No. 121404, 2 specimens, 86 and 96 mm., taken in the Río Barregas, tributary to Río Chama, just below Egido, Estado de Mérida, March 29.

U.S.N.M. No. 121401, 1 specimen, 41 mm., from the Río Cobre above mouth, tributary to Río Quinta, this tributary to Río La Grita, Catatumbo system, March 31.

U.S.N.M. No. 121400, 27 specimens, 34 to 162 mm., from the Río Chama at Estanques, Estado de Mérida, Venezuela, April 3.

U.S.N.M. No. 86265, a specimen 133 mm. in standard length, from Valera, Estado de Trujillo, Venezuela, was collected by Dr. H. Pittier.

Two specimens, F.M.N.H. Nos. 41997 and 41998, from Río Cogollo, Sierra Perijá, Lago Maracaibo Basin, Osgood and Conover, March 1920, were lent to me by the Chicago Natural History Museum for study and report.

The color pattern of this species is in need of description. Specimens 34 to 41 mm. have a black spot just behind the head, then a pale interspace of 1½ scale rows before the black lateral band begins, the latter fading out on caudal peduncle, but at 56 mm. the black lateral streak is continuous without interruption anteriorly; the round black spot near midbase of caudal fin is prominent; black spot in dorsal fin distinct, but the blackish streaks along back are obsolete.

When alive a specimen 79 mm. in standard length had the following coloration: Lateral streak black, caudal spot intensely black; median fins orange; paired fins orange, with outer rays and margins white; a series of orange spots below the black lateral streak on next row of scales, one on each scale, and anteriorly a second row of orange spots. At this size there is a second black band or streak along the upper part of the back, and this is more or less obvious in larger speci-

mens but fades soon after the fish are removed from the water, blending in with the blackish back.

When alive, a specimen 141 mm. in standard length had the following coloration: Black lateral band extending from the head to caudal peduncle, where it fades out; then at base of midcaudal fin rays is a round black spot, this spot a trifle above midaxis; back blackish; the pale band between black lateral band and blackish back with a row of orange spots, these fading on caudal region; two rows of orange spots, below black lateral band, one on each scale, then below these anteriorly a short row of yellow spots; paired fins brownish orange;

FIGURE 36.—*Piabucina pleurotaenia* Regan: U.S.N.M. No. 121400, 115 mm. in standard length.

anal and dorsal brownish orange, but adipose fin bright orange; caudal fin brownish orange to dull reddish posteriorly.

See table 13 for counts made on this species.

TABLE 13.—*Counts made on* Piabucina pleurotaenia

Number of fin rays							Number of gill rakers on first arch												Number of scales			
Dorsal	Anal	Pelvic	Pectoral				Above angle				At angle	Below angle							Rows on sides		From pelvic insertion to dorsal base	
ii, 8	ii, 8	i, 7	i, 12	i, 13	i, 14	i, 15	9	10	11	12	1	11	12	13	14	15	16	17	31	32	7	7½
7	7	7	2	10	3	1	1	1	2	1	5	1	---	2	---	1	---	1	2	6	3	3

Genus SALMINUS Agassiz

Salminus AGASSIZ, *in* Spix, Selecta genera et species piscium . . . Brasiliam . . ., p. 76, 1829. (Type, *Hydrocyon brevidens* Valenciennes (non *Hydrocyon brevidens* Cuvier) = *Salminus maxillosus* Valenciennes.)

SALMINUS HILARII Valenciennes

DORADA; SALTADORA; SUATA

Salminus hilarii VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 22, p. 64, 1849 (Río San Francisco).—PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 157, 1899 (Apure River).

U.S.N.M. No. 121399, a specimen 178 mm. in standard length, collected by Leonard P. Schultz, G. Zuloaga, Roger Sherman, and William Phelps, Jr., May 12, 1942, in the Río Guárico and tributaries between San Sebastián and San Casimiro, Estado de Aragua, Venezuela.

The following counts were made on this specimen: Dorsal rays ii, 9; anal iii, 22; pectoral i, 13–i, 13; pelvic i, 7–i, 7; scales 73, 13 from dorsal to lateral line and 5 or 6 to pelvic insertion.

Subfamily CHARACINAE

There seems to be confusion in regard to the nomenclature and relationships among certain genera related to *Charax*, especially the genera *Cynopotamus*, *Cyrtocharax*, *Gilbertolus*, and *Eucynopotamus*. Some of these have been used indiscriminately for one another. *Roeboides* may be distinguished from this group because it possesses external toothlike processes along the front of the upper jaw and sometimes also on the lower jaw.

After an examination of the type species, or the original description of the genotypes of these genera when actual specimens were not available, the following analysis was made. The key is intended to indicate some of the characters on which the various genera may be separated. The dentition is of the most importance.

1*a*. No external toothlike processes along front of upper or lower jaws.

2a. Lower jaw with two series of conical teeth anteriorly, external row with enlarged canines, but inner patch composed of small conical teeth in one or more rows.

3*a*. Two pairs of canines on premaxillaries and 4 or 5 pairs on mandibles; no small conical teeth between canines on lower jaw, inner series of small conical teeth on mandible confined to front of jaw; an outer row of small conical teeth between canines on each premaxillary, a pair of larger conical teeth representing inner row between pair of canines on each premaxillary; lower jaw included; pectoral shield not notched; origin of dorsal in front of anal origin; no keel in front of pelvics, but a low one behind pelvic bases to anus; anterior half of upper portion of first gill arch without elongate gill rakers, rough plates occurring instead.

Cynopotamus Valenciennes

3*b*. No canines; two series of short conical teeth on premaxillaries; mandible with 2 series of short conical teeth on anterior half, a single series posteriorly; origin of dorsal a little behind anal origin; origin of dorsal a trifle closer to snout tip than to midcaudal base; maxillary reaching to under front half of pupil; gill rakers about 5+1+18.

Eucynopotamus Fowler [22]

2*b*. Mandible with a single series of teeth, no row or patch of teeth at front of lower jaw inside outer series; canines present in both jaws.

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[22] *Evermannella* Eigenmann, Smithsonian Misc. Coll., vol. 45, p. 146, 1903. (Type, *Cynopotamus biserialis* Garman.)

Eucynopotamus Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 56, p. 119, 1904 (new name replacing *Evermannella* Eigenmann preoccupied). (Type; *C. biserialis* Garman.)

Evermannolus Eigenmann, in Eigenmann and Ogle, Proc. U. S. Nat. Mus., vol. 33, p. 3, 1907 (new name replacing *Evermannella* Eigenmann, preoccupied). (Type, *C. biserialis* Garman.)

4*a*. No keel in front of pelvic bases; 2 pairs of canines on premaxillaries, one near symphysis and the other pair laterally.

5*a*. Two rows of small conical teeth between two canines on each side of premaxillary; 2 pairs of canines on mandible; all canine teeth relatively short, not excessively elongate; pectoral shield large, acutely notched with an elongate pointed plate along lower base of pectoral fin; gill rakers along entire length of upper half of first gill arch; dorsal origin behind anal origin; dorsal origin a little closer to snout than to midcaudal base; no keel in front of pelvic base but a keel from pelvics to anus ..... **Charax** Scopoli [23]

5*b*. An outer row of small conical teeth between two canines on each premaxillary, inner row represented by 2 enlarged conical teeth on each side; 3 or 4 pairs of canines on mandible, middle pair more or less excessively elongate and fanglike and on large adults projecting even through snout when mouth is closed; pectoral shield with shallow notch; only platelets along anterior portion of upper half of first gill arch; dorsal origin over or usually behind anal origin; dorsal origin a little closer to snout tip than midcaudal base; a low ridge from behind pelvic base to anus ..... **Cyrtocharax** Fowler

4*b*. A sharp keel from anal origin to between bases of pectoral fins, thence as a hard ridge anteriorly on breast, becoming obsolete anteriorly; teeth in a single series on premaxillaries, with a single pair of short canines near their symphysis; 2 pairs of canines at front of mandibles; origin of dorsal much closer to midcaudal fin base than to tip of snout; dorsal origin behind anal origin; pectoral shield with a shallow notch; gill rakers along entire length of upper half of first gill arch; preopercle with platelike spiny projection at lower posterior angle.

Gilbertolus Eigenmann

1*b*. Toothlike external bony protuberances on margins of upper and often on lower jaws ..... **Roeboides** Günther

Genus CYNOPOTAMUS Valenciennes

Cynopotamus Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 22, p. 316, 1849. (Type, *Hydrocyon argenteus* Valenciennes, designated by Eigenmann, Mem. Carnegie Mus., vol. 5, p. 403, 1912, and by Jordan, Genera of fishes, pt. 2, p. 242, 1919.)

Roestes Günther, Catalogue of the fishes in the British Museum, vol. 5, pp. 345, 347, 1864. (Type, *Cynopotamus molossus* Kner.)

After an examination of the descriptions of various species, it is thought that the following species should be referred to this genus: *Cynopotamus humeralis* Valenciennes, in Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 22, p. 320, 1849, from Buenos Aires, also referred to as *Anacyrtus humeralis* Valenciennes by Günther,

[23] *Charax* Scopoli, Hist. Nat., p. 455, 1877. (Type, *Salmo gibbosus* Linnaeus.) After examination of the descriptions of the following species, it was concluded that they should be referred to the genus *Charax*. This list of species is not complete, and others that probably should be added I have not examined sufficiently to arrive at a definite conclusion: *Anacyrtus pauciradiatus* Günther, Catalogue of the fishes in the British Museum, vol. 5, p. 346, 1864 (Pará, Rio Capim); *Anacyrtus tectifer* Cope, Proc. Amer. Philos. Soc., vol. 11, p. 565, 1870 (Pebas, Ecuador); *Anacyrtus sanguineus* Cope, Proc. Acad. Nat. Sci. Philadelphia, vol. 23, p. 266, pl. 9, fig. 1, 1872 (Río Ambyiacu); *Charax rupununi* Eigenmann, Mem. Carnegie Mus., vol. 5, p. 402, 1912 (Rupununi); *Charax metae* Eigenmann, Bol. Soc. Colom. Cienc. Nat., vol. 9, p. 195, 1921, also Mem. Carnegie Mus., vol. 9, No. 1, p. 238, pl. 25, fig. 1, 1922 (Barrigóna, Quebrada Cramalote, Villavicencio, Colombia).

Catalogue of the fishes in the British Museum, vol. 5, p. 348, 1864; *Anacyrtus* (*Cynopotamus*) *knerii* Steindachner, Denkschr. Akad. Wiss. Wien, vol. 39, p. 65, 1878 (Cujaba; Río Paraguay; Irisanga); *Cynopotamus gulo* Cope, Proc. Amer. Philos. Soc., vol. 11, p. 565, 1870 (Pebas), referred to as *Eucynopstamus gulo* (Cope) by Pearson, Proc. California Acad. Nat. Sci., vol. 23, No. 7, p. 92, 1937 (Tingo de Pauca and Pusoc, above Balsas, Río Marañón, Peru).

Günther, in describing *Roestes* on page 345, says, "A. Mandibulary teeth in a single series" but on p. 347 says, "teeth of the mandible in a double series." Kner's description of *C. molossus* definitely says teeth are in a double series on the mandible but only an outer series is visible in his figure 16a. Of course, the inner series could be behind the outer series and thus not be shown. The type should be re-examined.

CYNOPOTAMUS HUMERALIS Valenciennes

Cynopotamus humeralis Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 22, p. 320, 1849 (Buenos Aires).

Anacyrtus humeralis Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 157, 1899 (Apure River, Venezuela).

Pellegrin's record for the Río Apure is somewhat out of the previously recorded range of this species, and it should be restudied to determine with more certainty if another species is involved.

Genus CYRTOCHARAX Fowler

Cyrtocharax Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 58, p. 454, 1906. (Type, *Anacyrtus limaesquamis* Cope.)

Unfortunately, there has been much confusion in regard to the genera related to *Cyrtocharax*, mostly because Eigenmann failed to recognize it and *Eucynopotamus* soon after they were named. Eigenmann (Amer. Nat., vol. 41, p. 770, 1907) states that "*Cyrtocharax* is synonymous with *Cynopotamus*, a subgenus of *Charax*. The type of *Cynopotamus* lacks a second row of teeth in the lower jaw." Again (Mem. Carnegie Mus., vol. 5, p. 403, 1912) he says, "I have examined the type of *Cynopotamus argenteus* (22 mm. long, Buenos Aires) in the Jardin des Plantes. I was unable to find an inner series of teeth in the lower jaw." That Eigenmann did not examine the genotype of *Cynopotamus*, which is *Hydrocyon argenteus* Valenciennes, seems quite certain because Valenciennes (Histoire naturelle des poissons, vol. 22, pp. 318–319, 1849) states definitely that the type of this genus is 8½ inches long and that on the lower jaw there is on the inside of the outer row a series of very small conical teeth. On the basis of our evidence, it is concluded that *Cyrtocharax* is not a synonym of *Cynopotamus*, but a distinct genus.

Among the species that I have noticed in the literature, and some of these are supplemented by specimens in the United States National Museum collections, it is concluded that the following should be referred to the genus *Cyrtocharax* Fowler; without the specimens at hand, it is, of course, not possible to determine which of these forms are valid species and which are synonyms:

Anacyrtus limaesquamis Cope (genotype), Proc. Amer. Philos. Soc., vol. 17, p. 686, 1878 (Peruvian Amazon); *Anacyrtus* (*Cynopotamus*) *magdalenae* Steindachner, Denkschr. Akad. Wiss. Wien, vol. 39, pp. 77, 78, pl. 12, figs. 2, 2a, 1878 (=*Anacyrtus* (*Cynopotamus*) *argenteus* of Steindachner (not Valenciennes), ibid. p. 62) (Río Magdalena); *Anacyrtus* (*Cynopotamus*) *amazonum* Günther, Proc. Zool. Soc. London, 1868, p. 246 (Xeberos); *Charax squamosus* Eigenmann and Kennedy, Proc. Acad. Nat. Sci. Philadelphia, vol. 55, p. 525, 1903 (Pasito Laguna, Paraguay); *Charax atratoensis* Eigenmann, in Eigenmann and Ogle, Proc. U. S. Nat. Mus., vol. 33, p. 33, fig. 8, 1907 (Truando, Colombia, type U.S.N.M. No. 1664); *Charax calliurus* Eigenmann and Kennedy, in Eigenmann, McAtee, and Ward, Ann. Carnegie Mus., vol. 4, No. 2, p. 142, pl. 43, fig. 1, 1907 (Pasito Laguna, Paraguay); *Cynopotamus bipunctatus* Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 15, No. 1, p. 13, 1909 (mouth of Río Suripa, Venezuela); *Cynopotamus essequibensis* Eigenmann, Mem. Carnegie Mus., vol. 5, p. 403, 1912 (Potaro Landing; Tumatumari; Rockstone, all British Guiana).

LaMonte (Amer. Mus. Nov., No. 784, p. 8, 1935) identified U.S.N.M No. 94627 from the Río Jurua as *Charax limaesquamis* (Cope), but upon examination I find it has iii,38 anal rays. This is the same number occurring in *Cyrtocharax amazonum* (Günther), and I refer it to this species, although it may be a new one. The humeral spot is as large as the eye and there is a darkish blotch on the back at the posterior tip of supraoccipital process not mentioned for *amazonum;* otherwise, there are no outstanding differences. A study of the original descriptions and what few specimens are available to me at this time indicates that the dorsal and anal rays vary in different localities as recorded in table 14. It would appear that in *C. limaesquamis*, *C. squamosus*, and *C. calliurus* there is a tendency toward ii,10 dorsal rays, but in the other species ii,9 rays.

Steindachner was the first to describe a *Cyrtocharax* from northern South America, *C. magdalenae* from the Río Magdalena, Colombia. Since that time, *C. atratoensis* from the Río Atrato system, Colombia, and *C. essequibensis* from the Río Essequibo system of British Guiana have been named. All these species are very closely related and differ only statistically from each other. Unfortunately, I do not have a large series of *Cyrtocharax*, except from the Maracaibo Basin, else a

more thorough study could be made of this problem. However, since the population of *Cyrtocharax* in the Maracaibo Basin differs statistically from those in adjoining basins, it is thought best to give it the rank of a new subspecies, which is described below. In that way it is possible to emphasize the different races.

CYRTOCHARAX MAGDALENAE VENEZUELAE, new subspecies

DIENTON

FIGURE 37

Holotype.—U.S.N.M. No. 121390, a specimen 203 mm. in standard length, collected by Leonard P. Schultz, March 2, 1942, in the Río Negro below mouth of Río Yasa, Maracaibo Basin.

Paratypes.—All the paratypes were collected by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

FIGURE 37.—*Cyrtocharax magdalenae venezuelae*, new subspecies: Holotype, U.S.N.M. No. 121390, 203 mm. in standard length.

U.S.N.M. No. 121398, 7 specimens, 165 to 293 mm. in standard length, collected along with the holotype and bearing same data.

U.S.N.M. No. 121394, 4 examples, 162 to 202 mm., collected March 6 in the Río Palmar at bridge, 70 km. southwest of Maracaibo.

U.S.N.M. No. 121395, 4 examples, 161 to 199 mm., taken February 26 in the Río Apón about 35 km. south of Rosaria, Maracaibo Basin.

U.S.N.M. No. 121396, 2 specimens, 205 and 206 mm., taken March 17 in the Río Motatán at bridge, 22 km. north of Motatán.

U.S.N.M. No. 121391, 2 specimens, 240 and 243 mm. obtained March 11 in a caño ¾ km. west of Sinamaica.

U.S.N.M. No. 121392, a specimen 208 mm., collected February 21 in the Río Palmar near Totuma, about 100 km. southwest of Maracaibo.

U.S.N.M. No. 121393, 5 specimens, 197 to 250 mm., collected February 24 in the Río Socuy, 3 km. above its mouth, Maracaibo Basin.

U.S.N.M. No. 121397, 2 examples, 225 and 238 mm., taken March 16 in the Río Machango at bridge south of Lagunillas, Maracaibo Basin.

TABLE 14.—*Counts recorded for various species of* Cyrtocharax

Species	Number of fin rays																				Number of gill rakers on first gill arch					
	Branched anal rays [1]																Dorsal	Pectoral			Pelvic	Above angle		At angle	Below angle		
	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	ii,9	ii, 10	i, 15	i, 16	i, 17	i, 7	2	3	1	4	5	6
amazonum [2]	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	---	2	---	---	2	1	---	1	1	---	--
m. magdalenae [3]	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	--	--	--	2	---	2	---	---	3	2	---	1	---	1	--
											X	X	X	X	X	X	X	X												
m. atratoensis [4]	--	--	--	--	--	--	--	1	--	1	--	--	--	--	--	--	--	--	2	---	3	1	---	4	2	---	2	1	1	--
								X	X	X	X																			
m. essequibensis [5]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	---	---	---	---	-----	1	---	1	---	1	--
		X	X	X	X	X	X																							
bipunctatus [6]	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	1	---	---	---	---	1	---	---	---	---	---	--
m. venezuelae	--	--	1	--	2	6	7	6	3	1	--	--	--	--	--	--	--	--	16	---	9	8	2	11	4	2	6	---	2	4
limaesquamis [7]	--	--	--	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	---	2	3	---	---	3	1	---	1	---	1	--
squamosus [8]	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	---	2	2	---	---	3	1	---	1	---	---	1
calliurus	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	---	1	---	---	---	-----	---	---	---	---	---	--

[1] For counts from the literature two simple rays have been subtracted from the total count to bring these counts into line with my counts on specimens.

[2] U. S. N. M. No. 94627 included with Günther counts.

[3] U. S. N. M. No. 79185 from Honda and from Steindachner. X=range of counts by Eigenmann as no numbers were given.

[4] U. S. N. M. No. 1664 types and Eigenmann. X=range of counts by Eigenmann as no numbers were given.

[5] All data from Eigenmann. X=range of counts by Eigenmann as no numbers were given.

[6] All data from Pellegrin.

[7] U. S. N. M. No. 1694 and from Cope.

[8] U. S. N. M. No. 44837 and from Eigenmann and Kennedy.

Description.—The description is based on the holotype and paratypes listed above. Detailed measurements were made on the holotype and two paratypes, and these data, along with the same measurements made on the type of *Cyrtocharax atratoensis* (Eigenmann), all expressed in hundredths of the standard length, are recorded in table 15.

The following counts were made, respectively, on the holotype and two paratypes (in parentheses): Dorsal rays ii, 9 (ii, 9; ii, 9); anal iii, 45 (iii, 45; iii, 45); pectoral i, 16–i, 17 (i, 15–i, 15; i, 16–i, 16); pelvic always i, 7; pores in lateral line 112 (108; 113); scales from dorsal origin to lateral line 28 (28; 27); scales from lateral line to pelvic insertion 22 (24; 21); number of scales in a zigzag row around caudal peduncle 39 (37; 36); gill rakers on first gill arch 3+1+6 (2+1+6; 2+1+5); scale rows between tip of supraoccipital process and dorsal origin about 77 (83; – –); branched caudal fin rays always 17.

TABLE 15.—*Certain measurements, expressed in hundredths of the standard length, recorded for two subspecies of* Cyrtocharax magdalenae

Characters measured	*venezuelae*		*atratoensis*	
	Paratype	Holotype	Paratype	U.S.N.M. No. 1664 holotype)
Standard length in millimeters	160	203	293	298
Length of head	28.5	28.8	28.3	29.3
Greatest depth of body	35.0	33.8	35.8	32.9
Length of snout (measured from front of bony orbit)	6.88	7.73	7.51	8.09
Diameter of eye	4.66	4.43	4.10	4.02
Diameter of bony orbit	6.88	6.90	6.48	6.54
Width of fleshy interorbital space	9.06	9.70	9.90	9.23
Length of postorbital part of head	15.3	16.2	15.6	15.8
Distance from tip of snout to rear of maxillary or length of mouth	19.7	20.2	21.6	21.1
Length of caudal peduncle, from base of last anal ray to midcaudal base	11.3	12.5	11.6	11.1
Least depth of caudal peduncle	8.94	9.02	8.20	8.56
Length of anal fin base	41.3	45.3	44.2	41.6
Length of longest ray of anal fin	14.4	15.0	13.0	13.8
Length of longest ray of dorsal fin	26.9	27.2	22.5	21.1
Length of longest ray of pectoral fin	19.4	20.5	17.7	16.8
Length of longest ray of pelvic fin	15.0	15.0	13.3	12.0
Length of longest ray of upper caudal lobe	22.2	21.2	19.8	----
Length of longest ray of lower caudal lobe	23.4	21.7	18.1	----
Distance from snout to dorsal origin	51.5	51.5	50.0	53.0
Distance from snout to anal origin	50.6	54.2	55.6	51.0
Distance from snout to adipose origin	86.9	90.6	86.7	86.6
Distance from snout to pelvic insertion	38.1	38.9	39.2	36.9
Distance from snout to pectoral insertion	27.2	26.6	27.3	27.5
Distance from snout to anus	48.8	50.2	----	49.6
Distance from tip of supraoccipital process to dorsal origin	28.1	29.1	27.0	29.2
Distance from snout to tip of supraoccipital process	23.7	22.7	23.2	25.5

Body compressed, greatest depth 2.9 to 3.2 at dorsal origin, head about 3½ to 3⅔ in standard length; head depressed over snout and eyes, then abruptly curved upward, so that the profile from snout to supraoccipital is greatly concave, then convex along rear of supraoccipital process; upper jaw at front of premaxillaries with a pair of canines followed on each side by about seven short conical sharp-pointed teeth, then another canine, the inner row of teeth on the premaxillaries is represented by two short canines between the pair of canines on each side; the short, sharp-pointed conical teeth on the maxillary numerous, in a single row; the teeth on the lower jaw in a single row, a short pair of conical teeth on dentaries at symphysis, then four pairs of canines, the next-to-last pair being long and fanglike; the posterior half of the dentary equipped with numerous short conical teeth in a single row; no teeth on palatines; the anterior part of the upper half of the first gill arch with 7 or 8 platelets, then 2 or 3 gill rakers, plus one at the angle and then 5 or 6 on lower half of the arch; the longest raker about equal to diameter of the pupil; the

second suborbital not covering the lower part of the cheek, which is naked; the maxillary reaching considerably past the rear of the eye; origin of dorsal a little in front of a vertical line through anal origin; a low keel or ridge from behind pelvic bases to anus; the lateral line running a nearly straight course along side of body, ending a scale row below axis of caudal peduncle; scales very much crowded along the back and more so anteriorly than posteriorly; 2 or 3 scale rows shielding base of anal rays; the pectoral shield in front of pectoral insertion with a shallow notch; lower angle of preopercle rounded, no spinelike projection; adipose fin present over rear of anal fin base; intestine short of one main loop; pyloric caeca numerous; air bladder large, walls very firm; fleshy interorbital about three, bony orbit about 4, snout about 4, all in length of head; the origin of dorsal fin is closer to tip of snout than midcaudal base by ½ length of maxillary bone or ⅔ bony orbit; the anal origin is equal distance from tip of snout and midcaudal base.

Color.—The side of the body above lateral line has a wide blackish or silvery band ending in a large caudal blotch that extends on base of caudal fin rays as far out as the accessory scales occur; the humeral spot above the lateral line behind the head is no larger than the pupil; peritoneum silvery.

Remarks.—This new subspecies is more like *Cyrtocharax magdalenae atratoensis* Eigenmann than the others in regard to shape and proportions of body, but differs in having fewer anal rays. The key below and table 14 indicate the differences between this form and others referred to this genus. At most, the subspecies of *magdalenae* are statistical races, and this description serves to point out the type of study required to confirm or disprove whether one or four forms should be recognized from British Guiana to the Atrato Basin.

Named *venezuelae* in honor of the country in which this subspecies was collected.

TENTATIVE KEY TO THE SPECIES OF CYRTOCHARAX

1*a*. Dorsal rays usually ii, 10.
  2*a*. Branched anal rays usually 41 or 42. **Cyrtocharax limaesquamis** (Cope)
  2*b*. Branched anal rays usually 50 or 51.
    3*a*. Basal portion of dorsal fin with a black blotch or bar.
      Cyrtocharax calliurus (Eigenmann and Kennedy)
    3*b*. Basal portion of dorsal fin without black color.
      Cyrtocharax squamosus (Eigenmann and Kennedy)
1*b*. Dorsal rays usually ii, 9.
  4*a*. Branched rays of anal fin usually 38; humeral black blotch as large as orbit. **Cyrtocharax amazonum** (Günther)
  4*b*. Branched rays of anal fin from 40 to 55 in number.
    5*a*. Humeral spot as large as eye, branched anal rays 50; depth of body 2¾ in standard length; pectoral rays said to be i, 13 (Río Suripa of Apure system, Venezuela). **Cyrtocharax bipunctatus** (Pellegrin)

5*b*. Humeral spot about size of pupil; depth of body 2.9 to 3.4 in standard length.

6*a*. Branched anal rays 48 to 55; depth about 3 to 3.4; head 4.2 to 4.33 (Río Magdalena).

Cyrtocharax magdalenae magdalenae (Steindachner)

6*b*. Branched anal rays 45 to 48; depth about 3; head about 3.7 to 4. (Río Atrato).

Cyrtocharax magdalenae atratoensis (Eigenmann)

6*c*. Branched anal rays usually 42 to 47; depth about 3; head about 3.5 to 3.8 (Maracaibo Basin).

Cyrtocharax magdalenae venezuelae, new subspecies

6*d*. Branched anal rays 39 to 44; depth about 3; head about 3.66 to 3.75 (British Guiana).

Cyrtocharax magdalenae essequibensis (Eigenmann)

CYRTOCHARAX BIPUNCTATUS (Pellegrin)

Cynopotamus bipunctatus Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 15, No. 1, p. 13, 1909 (mouth of Río Suripa, Apure system, Venezuela).

Genus GILBERTOLUS Eigenmann

Gilbertella Eigenmann, Smithsonian Misc. Coll., vol. 45, p. 147, 1903. (Type, *Anacyrtus* (*Raestes*) *alatus* Steindachner.)

Gilbertolus Eigenmann, *in* Eigenmann and Ogle, Proc. U. S. Nat. Mus., vol. 33, p. 3, 1907 (replaces *Gilbertella*, preoccupied).

KEY TO THE SUBSPECIES OF GILBERTOLUS ALATUS (STEINDACHNER)

1*a*. Pores in lateral line 58 to 59; pectoral rays usually i, 17; black caudal spot barely extending on base of middle rays of caudal fin (Magdalena Basin)

Gilbertolus alatus alatus (Steindachner)

1*b*. Pores in lateral line 63 to 68; pectoral rays usually i, 16; the black caudal spot extends on base of caudal fin rays as much as on the caudal peduncle (Maracaibo Basin)_____ **Gilbertolus alatus maracaiboensis** Schultz [24]

1*c*. Pores in lateral line 69 to 74; pectoral rays i, 17; the black caudal spot does not extend on base of caudal fin rays, and it becomes less distinct in large specimens (Atrato Basin)_____ **Gilbertolus alatus atratoensis** Schultz [24]

GILBERTOLUS ALATUS MARACAIBOENSIS Schultz

Figure 38

Gilbertolus alatus maracaiboensis Schultz, Journ. Washington Acad. Sci., vol. 33, p. 273, 1943 (Maracaibo Basin).

The following specimens were collected by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121386, the holotype, a female, 120 mm. in standard length, March 11, in a caño ¾ km. west of Sinamaica, along with four paratypes, U.S.N.M. No. 121387, 107 to 126.5 mm., bearing same data.

Other paratypes: U.S.N.M. No. 121388, an example, 61 mm., collected February 24, in the Río Socuy, 3 km. above its mouth; U.S.N.M. No. 121389, a specimen 75 mm., collected March 2, in the Río Negro below mouth of Río Yasa.

[24] Journ. Washington Acad. Sci., vol. 33, p. 275, 1943.

Genus ROEBOIDES Günther

eboides Günther, Catalogue of the fishes in the British Museum, vol. 5, p. 345, 1864 (type, *Epicyrtus microlepis* Reinhardt, designated by Eigenmann, Mem. Carnegie Mus., vol. 5, p. 398, 1912, and by Meek and Hildebrand, Field Mus. Nat. Hist. Publ. Zool., vol. 10, No. 15, p. 291, 1916).—Jordan, Genera of fishes, pt. 3, p. 333, 1919 (type designation, *Anacyrtus guatemalensis* Günther, and by Eigenmann and Allen, Fishes of western South America, p. 258, 1942).

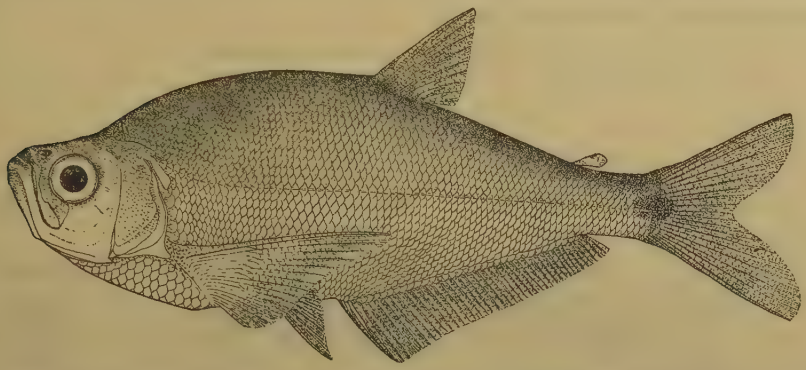

Figure 38.—*Gilbertolus alatus maracaiboensis* Schultz: Holotype, U.S.N.M. No. 121386, 120 mm. in standard length.

KEY TO THE SPECIES OF ROEBOIDES REPORTED FROM VENEZUELA

1*a*. Scale rows crossing lateral line about 110; anal rays 60; humeral and caudal spots present; head 4, depth 2⅔ in standard length.
Roeboides microlepis (Reinhardt)

1*b*. Scale rows crossing lateral line fewer than 95.

2*a*. Scales about 80; anal rays about 52 to 55; humeral and caudal spots more or less present **Roeboides affinis** (Günther)

2*b*. Scales about 53 to 65; anal rays 46 to 52; humeral and caudal spots blackish; origin of anal fin nearer snout than base of last anal ray.

3*a*. Scales 57 to 65 usually 60 to 64 **Roeboides dayi dayi** (Steindachner)

3*b*. Scales 53 to 59, usually 54 to 58.
Roeboides dayi dientonito, new subspecies

ROEBOIDES MICROLEPIS (Reinhardt)

Epicyrtus microlepis Reinhardt, Vid. Medd. Naturh. Foren. Kjøbenhavn, 1849, No. 1–2, p. 46 (Brazil).

Anacyrtus microlepis Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 157, 1899 (Apure River, Venezuela).

ROEBOIDES AFFINIS (Günther)

Anacyrtus affinis Günther, Proc. Zool. Soc. London, 1868, p. 246 (Huallaga).—Peters, Monatsb. Akad. Wiss. Berlin, 1877, p. 472 (Calabozo, Venezuela).

Roeboides affinis Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 57, 1891 (Calabozo).—Eigenmann and Allen, Fishes of western South America, p. 258, 1942 (Orinoco).

ROEBOIDES DAYI DAYI (Steindachner)

Anacyrtus (*Rhaeboides*) *dayi* Steindachner, Denkschr. Akad. Wiss. Wien, vol. 39, p. 61, 1878 (Río Magdalena).

? *Roeboides dayii* Eigenmann, Indiana Univ. Stud., vol. 7, No. 44, p. 12, 1920 (El Concejo, Río Tiquirito, Venezuela [Lake Valencia Basin]).

Since no specimens from Lake Valencia are available to me, I cannot work out the relationships of "*dayii*" from Lake Valencia in regard to the new subspecies.

ROEBOIDES DAYI DIENTONITO, new subspecies

Dientonito

Figure 39

Holotype.—U.S.N.M. No. 121370, a specimen 63 mm. in standard length, collected by Leonard P. Schultz, March 6, 1942, in the Río Palmar at the bridge, 70 km. southwest of Maracaibo.

Paratypes.—All the paratypes were collected by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121372, 14 specimens, 25.5 to 65 mm., collected along with the holotype and bearing same data.

U.S.N.M. No. 121380, 1 example, 64 mm., taken February 21 in the Río Palmar near Totuma, about 100 km. southwest of Maracaibo.

U.S.N.M. No. 121376, 2 examples, 16 and 53.5 mm., obtained February 26 from the Río San Juan, 12 km. south of Rosario, Estado de Zulia.

U.S.N.M. No. 121383, 140 specimens, 27 to 76 mm., collected March 2 in the Río Negro below mouth of Río Yasa.

U.S.N.M. No. 121384, 71 specimens, 27 to 76 mm., taken February 24 in the Río Socuy, 3 km. above the mouth.

U.S.N.M. No. 121377, 26 examples, 37 to 60 mm., taken February 26 in the Río Apón, about 35 km. south of Rosario, Estado de Zulia.

U.S.N.M. No. 121374, 24 examples, 11.5 to 45 mm., collected March 8, in a pond tributary to Río Gé near Rosario.

U.S.N.M. No. 121375, 112 specimens, 29.5 to 50 mm., collected May 1 in the Río Agua Caliente, 2 to 3 km. above Lago Maracaibo.

U.S.N.M. No. 121379, 155 specimens, 19 to 68 mm., taken March 1 in Lago Tulé about 75 km. west of Maracaibo, tributary to Río Socuy.

U.S.N.M. No. 121371, 91 examples, 20 to 74 mm., taken March 11 in Ciénaga del Guanavana about 10 km. north of Sinamaica.

U.S.N.M. No. 121378, 5 examples, 27 to 55 mm., taken March 16 in the Río Machango at bridge south of Lagunillas.

U.S.N.M. No. 121382, 20 specimens, 24 to 48 mm., taken March 11 in a caño ¾ km. west of Sinamaica.

U.S.N.M. No. 121381, 21 examples, 19 to 59 mm., collected March 17–20 in the Río San Juan near bridge south of Mene Grande, Motatán System.

U.S.N.M. No. 121373, 2 examples, 39 and 53 mm., taken March 20 in the Río San Pedro at bridge, Motatán system.

Description.—This description is based on the holotype and paratypes listed above. Detailed measurements were made on the holotype and one paratype, respectively, and these data are expressed in hundredths of the standard length. Standard length in millimeters 63 and 55.

Length of head 28.3 and 28.5; greatest depth at origin of anal fin 42.4 and 38.6; length of snout 7.94 and 8.00; diameter of eye 6.50 and 7.28; diameter of orbit 9.52 and 9.46; least width of interorbital space 7.14 and 7.46; greatest postorbital length of head 12.1 and 14.0; length of mouth from tip of snout to rear of maxillary 13.7 and 14.4; length of caudal peduncle from base of last anal ray to midbase of caudal fin 9.68 and 9.10; least depth of caudal peducle 9.68 and 8.91; length of anal fin base 53.3 and 51.3; distance from tip of supraoccipital spine to dorsal origin 22.2 and 22.9; length of longest ray of anal fin 14.9 and 15.8; longest dorsal ray 27.5 and 26.4; longest

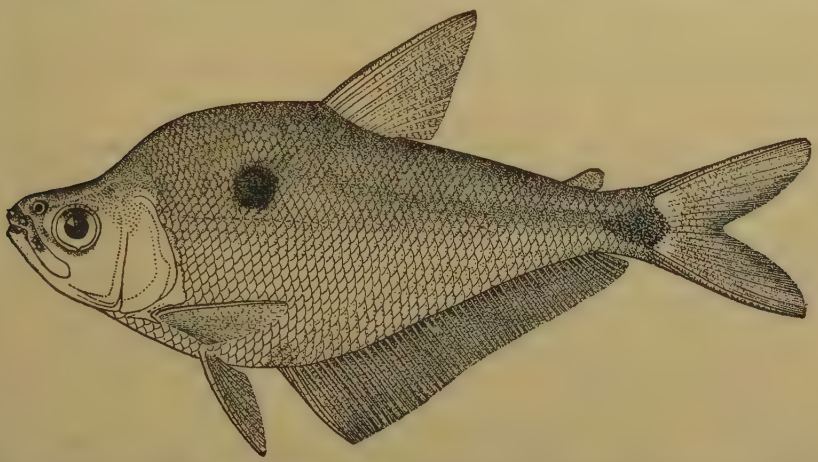

FIGURE 39.—*Roeboides dayi dientonito*, new subspecies: Holotype, U.S.N.M. No. 121370, 63 mm. in standard length.

pectoral ray 20.6 and 20.0; longest pelvic ray 19.1 and 20.6; length of longest ray of upper lobe of caudal fin 26.2 and 25.5, and of lower lobe 26.2 and – –; distance from tip of snout to dorsal origin 51.9 and 53.6; snout to anal origin 47.9 and 48.2; snout to adipose origin 88.9 and 88.4; snout to pelvic insertion 37.5 and 37.1; snout to pectoral insertion 27.8 and 28.2; snout to anus 45.2 and 44.6.

The following counts were made, respectively: Dorsal fin rays ii, 9 and ii, 9; anal rays iv, 48 and iv, 43; pectoral i, 13–i, 13 and i, 13–i, 13; pelvic i, 7–i, 7 and i, 7–i, 7; branched rays of caudal fin 16 and 17; number of scale rows crossing lateral line 55 and 58; above lateral line to dorsal origin 15 and 15; below lateral line to anal origin 14 and 14; gill rakers on first gill arch about 6+11 or 12. A summary of all counts is recorded in tables 16 and 17.

Profile from snout to over rear margin of eye nearly straight, then abruptly curving dorsally to origin of dorsal fin, thence tapering to base of caudal fin; greatest depth of body at origin of anal fin 2½ to 2⅔, head 3⅓ to 3¾ all in the standard length; length of anal fin base 1.8 to 1.9; greatest width of body about equal to least depth of caudal

TABLE 16.—*Counts recorded for species of* Roeboides

Species	Number of scale rows crossing lateral line																										
	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81
dayi dayi [1]	--	--	--	--	1	3	--	2	3	3	3	4	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
dayi dientonito [2]	1	3	5	5	3	2	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
affinis [3]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2

Species	Number of anal rays														
	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
dayi dayi [1]	1	4	8	7	4	1	1	----	----	----	----	----	----	----	----
dayi dientonito [2]	2	2	8	3	6	2	----	----	----	----	----	----	----	----	----
affinis [3]	----	----	----	----	----	----	1	----	----	1	----	----	----	----	----
microlepis [4]	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1

[1] Counts from Eigenmann (1920).

[2] The counts on this species have been brought in line with those made by Eigenmann, it is thought, by adding the simple and branched rays. However, Eigenmann may not have counted all four simple rays, and if he did not include the first one, which is more or less embedded, then these counts should each be reduced by one to bring them in line with Eigenmann's.

[3] Counts from Günther (1868) and Fowler (1939).

[4] Counts from Günther (1864).

TABLE 17.—*Counts made on* Roeboides dayi dientonito

Number of fin rays											Number of scales														
Dorsal	Anal							Pectoral			Pelvic	Rows of scales crossing lateral line							Above lateral line		To anal origin			To pelvics	
ii, 9	iv, 42	iv, 43	iv, 44	iv, 45	iv, 46	iv, 47	iv, 48	i, 13	i, 14	i, 15	i, 7	53	54	55	56	57	58	59	14	15	12	13	14	8	9
8	2	2	8	3	6	2	1	6	3	1	10	1	3	5	5	3	2	1	2	8	1	1	8	8	2

peduncle; distance from tip of snout to anal origin equal to distance from anal origin to base of last fourth to sixth anal rays; dorsal origin usually a very little closer to tip of snout than midbase of caudal fin; posterior edge maxillary reaches to under front of pupil (young) or to past middle of pupil in adults; front of upper jaw with four external toothlike projections and lower jaw with two such bony projections; origin of dorsal over about the third or fourth branched ray of anal fin. Usually the first branched ray of the dorsal fin longest, last ray shortest, about one-fifth the length of the first; last simple or first branched rays of anal fin longest, those following gradually a little shorter, the margin of anal fin nearly straight; first rays of paired fins longest; pectoral fins reach to anal origin and pelvic to base of fifth branched ray of anal fin; upper and lower lobes of caudal fin nearly equal in length and deeply forked; length of caudal

peduncle about equal to its least depth; intestine short, with one main loop.

Color.—Usually the color in alcohol is pale, with the margins of the scales weakly pigmented, but in the collection from the Río Agua Caliente the general color is blackish and the margins of the scales blackish; in life these fish had a dark purplish sheen. The humeral and caudal spots are blackish and always distinct; the peritoneum silvery with several black pigment spots; upper part of head, tips of snout, and chin usually with black pigment.

Remarks.—This new subspecies, *dientonito*, differs from *Roeboides dayi dayi* (Steindachner) in having fewer scales along the lateral line as indicated in the key on page 303 and in the tables.

Named *dientonito* in reference to the small toothlike protuberances on the upper lips and partly after the common name of this fish.

Genus BRYCON Müller and Troschel

Brycon Müller and Troschel, Arch. Naturg., vol. 10, No. 1, p. 90, 1844. (Type, *Brycon falcatus* Müller and Troschel.)

TENTATIVE KEY TO THE SPECIES OF BRYCON REPORTED FROM VENEZUELA, BASED WHOLLY ON LITERATURE

1*a*. Scales 54 to 56; anal rays 26; scales above lateral line 10½ or 11, below lateral line 7; pelvics 9; dorsal ii, 9; depth 3 and head 3 in standard length; interorbital 3, snout 3½ to 4, eye 3⅛ to 3⅜ all in head; humeral spot a little larger than pupil; caudal spot elongate, as much on peduncle as on base of midcaudal fin rays and not extending to end of caudal rays. **Brycon longiceps** Steindachner

1*b*. Scales 44 or 45; anal rays 25 or 26 (iii, 23 or iii, 24); scales above lateral line 8 and below it 4; pelvic rays i, 7; dorsal ii, 9; depth 3½ and head 3 in standard length; interorbital 3¾, eye 4½, snout 3⅜, all in head; humeral spot not shown in drawing of type; caudal spot elongate-oval shaped, barely extending on midcaudal fin ray **Brycon coquenani** Steindachner

BRYCON LONGICEPS Steindachner

Brycon longiceps Steindachner, Anz. Akad. Wiss. Wien, vol. 16, p. 150, 1879 [no locality given]; Denkschr. Akad. Wiss. Wien, vol. 41, p. 156, pl. 1, fig. 5, 1879 (Ciudad Bolívar, Venezuela).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 55, 1891 (Orinoco, Ciudad Bolívar).

BRYCON COQUENANI Steindachner

Brycon coquenani Steindachner, Denkschr. Akad. Wiss. Wien, vol. 93, p. 37, pl. 1, figs. 1, 2, 1917 (Río Coquenan in Venezuela).

Genus PYRRHULINA Valenciennes

Pyrrhulina Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 19, p. 535, 1846. (Type, *Pyrrhulina filamentosa* Valenciennes.)

PYRRHULINA FILAMENTOSA Valenciennes

Pyrrhulina filamentosa Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 19, p. 535, pl. 589, 1846 (Surinam).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 83, p. 407, 1931 (Pitch Lake at Guanoco; Caño Guanoco, Venezuela).

Genus COPEINA Fowler

Copeina Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 58, p. 294, 1906. (Type, *Pyrrhulina argyrops* Cope.)

COPEINA ARNOLDI Regan

Copeina arnoldi Regan, Ann. Mag. Nat. Hist., ser. 8, vol. 10, p. 393, 1912 (Amazon).

The following collection was lent to me for identification and report:

Five specimens, 22 to 30 mm., from Caripito, Venezuela, collected by Dr. William Beebe, 1942. A large series from this locality probably will reveal that they differ statistically from *C. arnoldi*.

Genus HOPLIAS Gill

Hoplias Gill, Proc. U. S. Nat. Mus., vol. 26, p. 1016, 1903. (Type, *Macrodon tareira=trahira* Müller.) (Substitute name for *Macrodon* Müller, preoccupied.)

HOPLIAS MALABARICUS (Bloch)

Esox malabaricus Bloch, Naturgeschichte der ausländischen Fische, vol. 8, p. 149, pl. 392, 1794.

Hoplias malabaricus Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 63, p. 433, 1911 (Pedernales, Venezuela).—Pearse, Univ. Wisconsin Stud., No. 1, p. 21, 1920 (Lake Valencia Maracay, Venezuela).—Eigenmann, Indiana Univ. Stud., vol. 7, No. 44, p. 9, 1920 (Río Tiquirito, and Río Tuy, El Concejo; Isla del Buro, Lake Valencia; Maracay, Río Bue, Venezuela).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 83, p. 407, 1931 (Pitch Lake at Guanoco; Caño Guanoco, Venezuela).—Röhl, Fauna descriptiva de Venezuela, p. 384, 1942 (Lago de Maracaibo).

Macrodon trahira Lütken, Vid. Selsk. Skr., ser. 5, nat. math. Afd., vol. 12, No. 2, p. 184, 1875 (Venezuela).—Regan, Proc. Zool. Soc. London, 1906, pt. 1, p. 382 (Venezuela).

Macrodon malabaricus Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 5, 157, 1899 (Apure R., Venezuela).

The following collections, except where otherwise indicated, were made by Leonard P. Schultz in the Maracaibo Basin of Venezuela during 1942:

U.S.N.M. No. 121554, 5 specimens, 57 to 141 mm., from Río San Pedro at bridge, Motatán system, March 20.

U.S.N.M. No. 121555, 4 specimens, 80 to 109 mm., Rio Machango, 20 km. above bridge, south of Lagunillas, March 21.

U.S.N.M. No. 121556, a specimen, 111 mm., Lago Tulé about 75 km. west of Maracaibo, March 1.

U.S.N.M. No. 121557, 2 specimens, 54 and 58 mm., Río Palmar near Totuma, about 100 km. southwest of Maracaibo, February 21.

U.S.N.M. No. 121558, a specimen, 25 mm., Río Machango at bridge south of Lagunillas, March 16.

U.S.N.M. No. 121559, 5 specimens, 26 to 144 mm., Río San Juan, 12 km. south of Rosario, February 26.

U.S.N.M. No. 121560, a specimen, 203 mm., Ciénaga del Guanavana, about 10 km. north of Sinamaica, March 11.

U.S.N.M. No. 121561, 9 specimens, 38 to 128 mm., Río San Juan at bridge, tributary to Río Motatán, March 20.

U.S.N.M. No. 121562, 3 specimens, 250, 294 and 303 mm., Lago Maracaibo at Palmarejo, April 10, 1942, collected by Frank J. Pospisil.

Field Mus. Nat. Hist. No. 41987, 1 specimen, Lago Maracaibo, W. H. Osgood, 1911.

Genus HOPLERYTHRINUS Gill

Hoplerythrinus Gill, Proc. U. S. Nat. Mus., vol. 18, p. 208, 1896. (Type, *Erythrinus unitaeniatus* Agassiz.)

HOPLERYTHRINUS UNITAENIATUS (Agassiz)

Erythrinus unitaeniatus Agassiz, *in* Spix, Selecta genera et species piscium . . . Brasiliam . . ., p. 42, pl. 19, 1829.—Regan, Proc. Zool. Soc. London, 1906, vol. 1, p. 382 (Venezuela).

?Erythrinus salvus Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 45, 1891 (Orinoco).

Erythrinus gronovii Peters, Monatsb. Akad. Wiss. Berlin, 1877, p. 472 (Calabozo, Venezuela).

Dr. William Beebe kindly lent the following specimens for my examination and report:

Two specimens, 87 and 210 mm. in standard length, from Caripito, Venezuela, 1942.

Two specimens, 34 and 37 mm., same data.

Genus ERYTHRINUS Scopoli

Erythrinus Scopoli, Introductio ad historiam naturalem . . ., p. 449, 1777. (Type, *Salmo erythrinus* Bloch and Schneider=*Erythrinus erythrinus* (Bloch and Schneider)=*Cyprinus cylindricus* Linnaeus.) (Ref. copied.)

ERYTHRINUS ERYTHRINUS (Bloch and Schneider)

Cyprinus cylindricus Linnaeus, Museum S. R. M. Adolphi Friderici . . ., p. 77, pl. 30, 1754.

Cyprinus cephalus Linnaeus, Systema naturae, ed. 10, vol. 1, p. 322, 1758.

Synodus erythrinus Bloch and Schneider, Systema ichthyologiae, p. 397, 1801 (ref. copied).

The following specimens collected by Dr. William Beebe in Venezuela were kindly lent to me for examination and report:

Two specimens, 29 and 80 mm., from Caripito, 1942.

Two specimens, 130 mm. (both), from Caripito, May 7, 1942.

Genus ELACHOCHARAX Myers

Elachocharax Myers, Bull. Mus. Comp. Zool., vol. 68, No. 3, p. 114, 1927. (Type, *Elachocharax pulcher* Myers.)

ELACHOCHARAX PULCHER Myers

Elachocharax pulcher Myers, Bull. Mus. Comp. Zool., vol. 68, No. 3, p. 115, 1927 (Caño de Quiribana, near Caicara, Venezuela).

KEY TO THE GENERA AND SPECIES RESEMBLING PARAGONIATES STEINDACHNER

1*a*. Mouth large, distance from tip of snout to rear of maxillary equal to or longer than postorbital length of head, much longer than interorbital width and

1½ times in distance from tip of snout to tip of occipital process; tip of snout to occiput about 2⅔ times in length of anal fin base; adipose fin present; dorsal rays usually ii, 9; palatines toothless.

2*a*. Preventral area trenchant, with low keel, scales forming a median ridge; lateral line incomplete, with about 13 pores anteriorly; base of caudal fin of males without glandular scales; anal sheath of 2 or 2½ rows of scales; lower jaw included; origin of dorsal midway between rear of eye and base of caudal fin; dorsal origin over fifth to seventh branched rays of anal; anal rays v or vi, 40 to 44; pectoral i, 12 or i, 13; pelvic i, 7; scales 39 to 41, 15 ½ between origins of dorsal and anal fins; depth 2¾ to 3¼; head 4 to 4⅓ in standard length; snout 3½ to 3⅔, interorbital 2⅔ to 3, eye 2⅔ to 3, mouth 1¾ to 1⅘, all in length of head; an obscure caudal spot present.

Paragoniates alburnus Steindachner

2*b*. Preventral area rounded, not keeled; lateral line with 3 to 5 pores; base of caudal fin of males with glandular scales; anal rays iv or v, 28; pectoral i, 10; pelvic i, 6; scales 44; 13 or 14 in a transverse series; eye 3 to 3½ and interorbital 2½ to 2¾ in the head; head 1½ in caudal fin; a distinct grayish band along upper side of back.

Mimagoniates microlepis (Steindachner) [25]

1*b*. Mouth short, distance from tip of snout to rear of maxillary 1⅓ in postorbital length of head, about equal to interorbital width, and 2 to 2½ times in distance from tip of snout to occiput; tip of snout to occiput 3 to 5 times in length of anal fin base.

3*a*. Adipose fin absent; palatines toothless; lateral line incomplete, with 9 to 16 pores; dorsal rays ii, 7; anal rays 49 to 53 (about v, 48 to v, 52); pectorals i, 10 or i, 11; pelvics i, 5; scales 40 to 44; origin of dorsal midway between base of caudal peduncle and posterior third of eye; tip of snout to occiput 3½ times in anal base; head 4⅔ to 5⅒, depth 3⅓ to 3⅘ in standard length; snout 3⅔ to 4⅓, eye 2⅔ to 3, interorbital 2⅖ to 3⅖ in head; about 5+8 gill rakers on first arch.

Phenagoniates macrolepis (Meek and Hildebrand)

3*b*. Adipose fin present; lateral line complete; dorsal rays 10 or 11; pectoral i, 11 or i, 12; scales from dorsal origin to lateral line 7 and from anal origin to lateral line 7; depth 4, head 5¼ to 6, length of base of anal fin 1⅔ all in standard length; dorsal origin over about twenty-second to twenty-fourth anal ray.

4*a*. Anal rays 68, pelvic about i, 6; scales 48; dorsal origin an equal distance between pupil and midbase of caudal fin; palatines without teeth.

Leptagoniates steindachneri [26] Boulenger [27]

4*b*. Anal rays 63 to 66; pelvic i, 5 or i, 6; scales 50 or 51; origin of dorsal an equal distance between middle third of length of pectoral fin and midbase of caudal fin; palatines with a small patch of teeth.

Xenagoniates bondi Myers

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[25] *Paragoniates microlepis* Steindachner, Sitzb. Akad. Wiss. Wien, vol. 74, p. 33, 1876 (Bäche in der Nähe von Rio Janeiro, Rio dos Macacos).—Eigenmann, Repts. Princeton Univ. Exped. Patagonia 1896–1899, vol. 3, pt. 4, p. 441, 1910. This species was included here because it superficially resembles *Paragoniates* Steindachner but differs from that group by having two rows of teeth on each premaxillary.

[26] A. Fraser-Brunner, British Museum (Natural History), kindly examined the type of this species and states in a letter to me dated June 19, 1944: "There are no teeth on the palatines, nor on vomer; there are 18 teeth in upper jaw, 10 in the lower. The dorsal fin has 3 simple rays followed by 8 branched rays. All the 68 anal rays are simple. The uppermost pectoral ray is simple and thickened, the 11 following being branched; the pelvic has i, 6, the first being stout and strong. There are 48 scales."

[27] *Leptagoniates steindachneri* Boulenger, Proc. Zool. Soc. London, 1887, pp. 281, 282, pl. 23, fig. 3 (Sarayacu, Ecuador).—Eigenmann, Repts. Princeton Univ. Exped. Patagonia 1896–1899, vol. 3, Zoology, pt. 4, p. 441, 1910.—Eigenmann and Allen, Fishes of Western South America, p. 270, 1942.

Myers (1942) gives for this species the following reference, which I have not seen: Arnold and Ahl, Fremländ, Süsswasserf., 1936, p. 89.

Genus PARAGONIATES Steindachner

Paragoniates Steindachner, Sitzb. Akad. Wiss. Wien, vol. 74, p. 69, pl. 8, fig. 3, 1876. (Type, *Paragoniates alburnus* Steindachner.)

PARAGONIATES ALBURNUS Steindachner

Paragoniates alburnus Steindachner, Sitzb. Akad. Wiss. Wien, vol. 74, p. 69, pl. 8, fig. 3, 1876 (Amazon River at Teffé).

A specimen, 59 mm. in standard length, collected at Caripito, Venezuela, 1942, by Dr. William Beebe, was kindly turned over to me for study and report. A brief description of this specimen follows, all measurements being expressed in hundredths of the standard length, which is 59 mm.

Length of head 25.3; greatest depth 31.4; length of snout 7.12; eye 9.15; interorbital space 8.98; postorbital length of head 10.7; tip of snout to rear of maxillary 12.9; least depth of caudal peduncle 11.9; length of caudal peduncle from base of last anal ray to midcaudal fin base 7.97; length of anal fin base 43.6; longest anal ray 15.7; longest dorsal ray 20.7; longest pectoral ray 24.6; longest pelvic ray 20.0; length of upper caudal fin lobe 26.3 and of lower lobe 29.7; distance from snout tip to dorsal origin 60.2; snout to anal origin 56.0; snout to adipose origin 90.6; snout to pelvic insertion 40.6 and to pectoral insertion 27.1; snout to anus 50.8; snout to occiput 20.5.

The following counts were made: Dorsal rays ii, 9; anal vi, 40; pelvic i, 7–i, 7; pectoral i, 13–i, 13; scales 39, above lateral line to dorsal origin 7 and below it to pelvic insertion 4; pores in lateral line 13; scales in front of dorsal 18; 2½ scale rows in anal sheath anteriorly and 2 posteriorly; gill rakers 7+1+10; branched caudal fin rays 16.

Genus PHENAGONIATES Eigenmann and Wilson

Phenagoniates Eigenmann and Wilson, *in* Eigenmann, Henn, and Wilson, Indiana Univ. Stud., No. 19, p. 2, 1914. (Type, *Phenagoniates wilsoni* Eigenmann.)

PHENAGONIATES MACROLEPIS (Meek and Hildebrand)

Roeboides macrolepis Meek and Hildebrand, Field Mus. Nat. Hist. Publ. Zool. vol. 10, No. 8, p. 84, 1913 (Río Cupe, Boca de Cupe, Río Tuyra Basin).

Phenagoniates wilsoni Eigenmann, *in* Eigenmann, Henn, and Wilson, Indiana Univ. Stud., No. 19, p. 2, 1914 (Manigru; Certegui; Truando).

Phanagoniates macrolepis Meek and Hildebrand, Field Mus. Nat. Hist. Publ. Zool., vol. 10, p. 272, 1916 (Río Tuyra Basin).—Eigenmann, Mem. Carnegie Mus., vol. 7, p. 43, pl. 5, fig. 1, 1916 (Manigru; Certegui; Truando).—Eigenmann, Mem. Carnegie Mus., vol. 9, No. 1, p. 128, 1922 (Atrato and Tuyra Basins).—Breder, Bull. Amer. Mus. Nat. Hist., vol. 57, p. 117, 1927 (Río Chico; Río Sucubti).—Hildebrand, Field Museum Nat. Hist., Publ. Zool., vol. 22, No. 4, p. 249, 1938 (Tuyra and Atrato Basins).

Phenagoniates macrolepis Myers, Stanford Ichth. Bull., vol. 2, No. 4, p. 91, 1942 (Maracaibo Basin).

The following collections were made by Leonard P. Schultz in the Maracaibo Basin of Venezuela during 1942:

U.S.N.M. No. 121349, 19 specimens, 21 to 35 mm., from the Río Apón, about 35 km. south of Rosario, February 26.

U.S.N.M. No. 121350, 2 examples, 28 and 31 mm., from the Río San Pedro at bridge, tributary to Río Motatán, March 20.

U.S.N.M. No. 121351, 18 examples, 22.5 to 34 mm., taken in the Río San Juan at bridge, tributary to Río Motatán, March 20.

U.S.N.M. No. 121355, 2 specimens, 31 and 33 mm., from the Río Jimelles, 12 km. east of Motatán, tributary to Río Motatán, March 24.

U.S.N.M. No. 121353, 26 specimens, 23.5 to 32.5 mm., taken in the Río Machango at bridge south of Lagunillas, March 16.

U.S.N.M. No. 121354, 13 examples, 24 to 25 mm., collected in the Río San Juan, 12 km. south of Rosario, February 26.

U.S.N.M. No. 121358, 4 specimens, 32 to 37.5 mm., taken in the Río Motatán, 8 km. below Motatán, March 24.

U.S.N.M. No. 121352, 2 examples, 25 and 30 mm., collected at the mouth of Caño de Sagua, 35 km. north of Sinamaica (salinity 1.021), March 12.

U.S.N.M. No. 121357, 94 specimens, 12 to 26.5 mm., from the Río Negro below mouth of Río Yasa, March 2.

U.S.N.M. No. 121356, a specimen, 30.5 mm., from the Río Motatán at the bridge, 22 km. north of Motatán, March 17.

U.S.N.M. 121553, a specimen 35 mm. from the Río Palmar at bridge 70 km. southwest of Maracaibo, March 6.

Genus XENAGONIATES Myers

Xenagoniates Myers, Stanford Ichth. Bull., vol. 2, p. 90, fig. 1, 1942. (Type, *Xenagoniates bondi* Myers.)

XENAGONIATES BONDI Myers

Xenagoniates bondi Myers, Stanford Ichth. Bull., vol. 2, p. 90, 1942 (Río Amana, 6 km. east of Santa Bárbara and 35 km. [?] west [south] of Maturin, [eastern] Venezuela).

Genus APHYOCHARAX Günther

Aphyocharax Günther, Proc. Zool. Soc. London, 1868, p. 245. (Type, *Aphyocharax pusillus* Günther.)

APHYOCHARAX ERYTHRURUS Eigenmann

Aphyocharax erythrurus Eigenmann, Mem. Carnegie Mus., vol. 5, p. 313, 1912 (Rockstone sand bank; Maripicru Creek; Crab Falls).

Two specimens, 45.5 and 48.5 mm., collected by Dr. William Beebe, at Caripito, Venezuela, 1942, were lent to me for identification and report.

Genus PRISTELLA Eigenmann

Pristella Eigenmann, Bull. Mus. Comp. Zool., vol. 52, No. 6, p. 99, 1908. (Type, *Holopristes riddlei* Meek.)

PRISTELLA RIDDLEI (Meek)

Holopristes riddlei Meek, *in* Eigenmann and Ogle, Proc. U. S. Nat. Mus., vol. 33, p. 11, 1907 (Los Castillas, Venezuela).

Pristella riddlei Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 83, p. 407, 1931 (Pitch Lake at Guanoco, Venezuela).

One specimen, 22 mm., from Caripito, Venezuela, 1942, collected by Dr. William Beebe, was lent to me for identification and report.

Subfamily Cheirodontinae

KEY TO THE GENERA AND SPECIES OF CHEIRODONTINAE REPORTED FROM VENEZUELA

1*a*. Lateral line incomplete, with about 6 to 8 pores; teeth on premaxillary and dentary usually with 7 points; 2 or 3 teeth on maxillary and 5 on each side of premaxillary; scales 27 to 31; about 10 scales in front of dorsal origin; gill rakers about 6 or 7+10 or 11 on first gill arch; dorsal rays usually ii, 9; anal usually iii, 16 to iii, 18 (range iii, 14 to iii, 19); on lower side of caudal peduncle on adult males about 17 to 22 projecting interhaemals; no dermal sac or enlarged scales on base of caudal fin.

Cheirodon insignis Steindachner

1*b*. Lateral line complete; interhaemals not projecting as in *Cheirodon;* dorsal rays ii, 9.

2*a*. Teeth on premaxillary and on dentary usually 7-pointed and similar in both jaws, distal part of each tooth enlarged (fig. 41, *a*, *b*), much broader than its base and sides of teeth in dentary not parallel; maxillary with 2 teeth and premaxillary usually with 5 teeth on each side.

3*a*. Lower lobe of caudal fin with a dermal bag more or less covered with a few enlarged scales (fig. 41*c*,); anal rays iii, 17 to iii, 19; scales 33 to 35, with 5 above and 3 or 4 below the lateral line; black pigment at tips of first to fourth or fifth branched rays of dorsal and of anal fins.

Saccoderma melanostigma, new genus and species

3*b*. Base of caudal fin "naked" without enlarged scales and without a dermal sac developed, the scales of body ending near base of caudal fin as is usual on many species of fishes; anal rays "23 to 25" [probably iii, 21 to iii, 22]; scales 32 to 34 ..... **Odontostilbe pulcher** (Gill)

2*b*. Teeth on premaxillary and on dentary not of same shape (fig. 43), but usually 5-pointed, the 2 outer points minute and located at lower sides of next inner point of tooth; maxillary with teeth; caudal fin with scales only at base and none enlarged, no dermal sac on lower lobe of caudal fin; anal rays iii,20 to iii,22; scales 35 to 37; 5 above and 4 below lateral line; premaxillary teeth 6 on each side; gill rakers about 8+14; a caudal spot developed ..... **Cheirodontops geayi**, new genus and species

Genus CHEIRODON Girard

Cheirodon Girard, Proc. Acad. Nat. Sci. Philadelphia, vol. 7, p. 199, 1854. (Type, *Cheirodon pisiculus* Girard.)

CHEIRODON INSIGNIS Steindachner

Chirodon insignis Steindachner, Denkschr. Akad. Wiss. Wien, vol. 42, p. 74, pl. 6, fig. 3, 1879 (Río Cauca).

The following collections were made by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121518, 134 specimens, 15 to 25 mm., Río Negro below mouth of Río Yasa, March 2.

U.S.N.M. No. 121513, 114 specimens, 17 to 23 mm., Río San Juan near bridge south of Mene Grande, Motatán System, March 17–20.

U.S.N.M. No. 121511, 357 examples, 14 to 21 mm., Río Machango at bridge south of Lagunillas, March 16.

U.S.N.M. No. 121509, 13 examples, 20 to 23 mm., Río San Pedro at bridge south of Mene Grande, Motatán System, March 20.

U.S.N.M. No. 121514, a specimen, 18.5 mm., from mouth of Caño de Sagua, 35 km. north of Sinamaica, March 12.

U.S.N.M. No. 121516, 3 specimens, 16.5 to 21 mm., Río San Ignacio in drying-up pool, about 20 km. south of Rosario, February 26.

U.S.N.M. No. 121510, 4 examples, 19 to 22 mm., Río Apón about 35 km. south of Rosario, February 26.

U.S.N.M. No. 121512, a specimen, 24 mm., from caño ¾ km. west of Sinamaica, March 11.

U.S.N.M. No. 121515, a specimen, 25.5 mm., Río Jimelles, 12 km. east of Motatán, Motatán system, March 24.

U.S.N.M. No. 121517, a specimen, 20 mm., Río San Juan, 12 km. south of Rosario, February 26.

The maxillary has 2 or 3 teeth and on each premaxillary 5 teeth; dentary with 6 or 7 teeth on each side; all teeth are with 6 or 7 points. There are about 6 pores in the lateral line and the scales vary from 27 to 31; about 10 scales in front of the dorsal origin; gill rakers about 6 or 7+10 or 11. Additional counts are recorded in table 18.

In life, the base of each lobe of caudal fin has a bright orange spot; dorsal and anal fins orange.

TABLE 18.—*Counts made on* Cheirodon insignis *from the Maracaibo Basin*

Number of fin rays													Interhaemals on lower side of caudal peduncle on adult males					
Dorsal			Anal						Pelvic		Pectoral							
ii, 8	ii, 9	ii, 10	iii, 14	iii, 15	iii, 16	iii, 17	iii, 18	iii, 19	i, 6	i, 7	i, 10	i, 11	17	18	19	20	21	22
1	12	1	1	1	6	11	4	1	1	14	9	4	2	4	6	4	-----	1

SACCODERMA, new genus

Genotype.—Saccoderma melanostigma, new species.

Named *Saccoderma* in reference to the dermal sac on the caudal fin.

This new genus, *Saccoderma*, is proposed to include those species of fish now referred to the genus *Odontostilbe* Cope that have on the lower lobe of the caudal fin a dermal bag with the opening posteriorly and partially covered by enlarged scales basally and dorsally (fig. 41*c*), as contrasted with the other species which lack this saclike fold of skin and are usually described as "caudal naked in the male." This latter group remain in the genus *Odontostilbe*. Other characters of this new genus are those of the genotype—*Saccoderma melanostigma*, new species, described below.

I refer to this new genus one other species, *Saccoderma hastata* (Eigenmann) (=*Odontostilbe hastata* Eigenmann), from the Magdelena and Atrato Basins of Colombia, represented by two specimens, U.S.N.M. No. 79223.

I would be inclined to hesitate in naming this new genus *Saccoderma* if the dermal saclike structure occurred only on the males, but on the new species described below I find it fully developed on the females. This discovery causes me to cast serious doubt on Eigenmann's statement that only the males of *O. hastata* have the pouch on the lower lobe of the caudal fin. In fact, Eigenmann's figure 33 (Mem. Carnegie

FIGURE 40.—*Saccoderma melanostigma*, new genus and species: Holotype, U.S.N.M. 121519, 27 mm. in standard length.

FIGURE 41.—*Saccoderma melanostigma*, new genus and species: *a*, Premaxillary tooth; *b*, mandibular tooth; *c*, enlargement of saclike gland on caudal fin.

Mus., vol. 7, No. 1, p. 91, 1915) resembles the caudal scales on the females of *Saccoderma melanostigma* more than on the males, and I presume that *hastata* should be reexamined carefully with this new information in mind.

SACCODERMA MELANOSTIGMA, new species

FIGURES 40, 41

Holotype.—U. S. N. M. No. 121519, a specimen 27 mm. in standard length, collected by Leonard P. Schultz, March 17 to 20, 1942, in the Río San Juan near bridge, south of Mene Grande, Motatán system.

Paratypes.—All the paratypes were collected by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121525, 23 specimens, 24 to 27 mm. in standard length, collected along with the holotype and bearing same data.

U.S.N.M. No. 121522, 24 specimens, 18 to 29 mm., Ciénaga del Guanavana about 10 km. north of Sinamaica, March 11.

U.S.N.M. No. 121528, 108 examples, 18 to 26 mm., Río Negro below mouth of Río Yasa, March 2.

U.S.N.M. No. 121524, 3 examples, 23.5 to 28.5 mm., caño ¾ km. west of Sinamaica, March 11.

U.S.N.M. No. 121527, 4 specimens, 19.5 to 24 mm., Río Apón about 35 km. south of Rosario, February 26.

U.S.N.M. No. 121529, 9 specimens, 21 to 26 mm., Río Palmar at bridge, 70 km. soutwest of Maracaibo, March 6.

U.S.N.M. No. 121521, 44 specimens, 17 to 28 mm., Río Socuy, 3 km. above mouth, February 24.

U.S.N.M. No. 121526, 7 examples, 16.5 to 21 mm., Río Machango at bridge south of Lagunillas, March 16.

U.S.N.M. No. 121530, 4 examples, 25 to 26 mm., Río Palmar near Totuma, about 100 km. southwest of Maracaibo, February 21.

U.S.N.M. No. 121520, 5 examples, 22.5 to 25 mm., Río San Pedro at bridge south of Mene Grande, March 20.

U.S.N.M. No. 121523, 3 specimens, 19 to 25 mm., Lago Tulé about 75 km. west of Maracaibo, March 1.

This species reaches a length of 29 mm. and at this size and at smaller sizes numerous specimens were fully mature. It occurs in the lower courses of the streams in quiet waters and in swampy areas.

TABLE 19.—*Counts made on species of* Saccoderma

Species	Number of fin rays									Number of scales					
	Dorsal	Anal			Pectoral				Pelvic	Rows on sides			Above lateral line	Below lateral line	
	ii, 9	iii, 17	iii, 18	iii, 19	i, 10	i, 11	i, 12	i, 13	i, 7	33	34	35	5	3	4
melanostigma	12	5	10	5	4	8	1	1	13	1	3	1	5	2	2
hastata	2	1	----	1	2	2	----	----	2	----	1	----	2	1	1

Description.—The description is based on the holotype and paratypes listed above. Detailed measurements were made in the former and one of the latter and these data, expressed in hundredths of the standard length, are recorded below, first for the holotype and then the paratype in parentheses. Standard length in millimeters 27 (28).

Length of head 27.8 (28.3); greatest depth 33.3 (30.7); length of snout 6.66 (6.30); diameter of eye 10.0 (11.1); distance from tip of snout to rear edge of maxillary 8.15 (9.63); width of interorbital space 8.15 (8.15); postorbital length of head 11.9 (12.6); least depth of

caudal peduncle 13.0 (11.1); length of caudal peduncle 15.9 (17.0); length of base of anal fin 24.4 (25.9); length of longest ray of anal fin 19.6 (20.7); length of longest ray of dorsal fin 27.0 (27.4); longest pectoral ray 19.6 (21.1); longest pelvic ray 17.8 (18.5); length of upper lobe of caudal fin 30.7 (31.5); length of lower caudal lobe 32.2 (33.3); distance from snout to dorsal origin 51.8 (54.0); snout to adipose origin 83.4 (87.8); snout to anal origin 65.6 (68.9); snout to pelvic insertion 48.2 (48.5); snout to pectoral insertion 27.0 (26.7); snout to anus 61.1 (63.4); distance from dorsal origin to midcaudal fin base 54.4 (53.4); distance from dorsal origin to tip of adipose fin 43.0 (42.6).

The following counts were made, respectively: Dorsal rays ii,9 (ii, 9); anal iii, 18 (iii, 18); pectoral i, 11-i, 11 (i, 11-i, 11); pelvic i, 7-i, 7 (i, 7–i, 7); branched caudal fin rays 17 (17); gill rakers on first gill arch—(8+12); scale rows crossing side of body 35 (34); scales above lateral line 5 (5) and below 4 (3); scales in front of dorsal 11 (11) and along one side of supraoccipital process 2 (2); teeth on each side of premaxillary 5+5 (5+5); teeth on maxillaries 2+2 (2+2); teeth on each side of mandible 2+3—3+2 (1 or 2+3—3+2). Additional counts are recorded in table 19.

Body compressed, its greatest depth 3.0 to 3.6, head 3.4 to 3.8, in standard length; dorsal and ventral profiles equally arched; snout bluntly rounded, about ⅔ eye, and shorter than interorbital space; eye large, about 2.6 to 2.9, and interorbital space convex, its width 3.2 to 3.3 in head; mouth terminal, a little oblique, both jaws of nearly same length, level of mouth when closed a little above lower edge of pupil; maxillary reaching to under front edge of eye; nasal openings separated by a dermal flap; predorsal and preventral areas evenly and normally scaled; lateral line complete; gill rakers short, slender, about 6 to 8 + 10 to 12 on first gill arch; second suborbital along its lower margin in contact with preopercle and scarcely any or no naked area along its posterior margin; teeth in both jaws in a single series; each tooth at front of jaws with about 6 or 7 points, distal margin of each tooth broad (see figure 41); each maxillary with 2 teeth; premaxillary with 5 teeth on each side; dentary on each side with 3 enlarged teeth at front of jaw and then usually 2 smaller ones at sides; supraoccipital process short, bordered by about 2 or 2½ scales; adipose fin well developed; origin of dorsal a trifle closer to snout tip than to midcaudal fin base; pelvic insertion in advance of a vertical line through dorsal origin; a vertical line through base of last dorsal ray usually passes through anal origin; pelvics inserted an equal distance between tip of snout and base of last anal ray; distal margin of anal fin a little concave, that of dorsal fin truncate; caudal fin deeply forked; distal margins of paired fins a little concave; last simple and first branched ray of all fins longest; gill membranes free from isthmus;

intestine with one main loop; pectoral fins reaching a little past pelvic insertions and pelvics almost to anal origin; depressed dorsal fin reaches to front edge of third scale in front of adipose origin.

In the male the middle two-thirds of the first 10 to 12 branched anal rays have small retrorse hooks, those on the first five rays enlarged; rays of lower lobe of caudal fin of males with retrorse hooks.

The dermal sac on base of lower caudal fin lobe is shown for the holotype in figure 41, *c*.

Coloration.—In alcohol this species is pale, with a black caudal spot that occurs about equally on caudal peduncle and on midbase of caudal fin, posteriorly this spot ending in a blunt point and not extending out on the middle caudal fin rays; midaxis of body posteriorly with a narrow silvery streak, or a series of more or less embedded black pigment cells; base of anal rays outlined with black pigment; along the back the margins of the scale pockets with black pigment; above base of anal fin are 2 or 3 irregular rows of black pigment cells rather widely separated from each other; dorsal surface of head, tip of snout, and front of lower jaw rather heavily black pigmented; tips of second to fourth or fifth branched rays of dorsal fin with black pigment, tips of first to fourth branched anal rays with black pigment.

The following color notes were recorded for this species when it was taken out of the Río San Pedro on March 20, 1942: Base of each lobe of caudal fin bright red above and below black caudal spot; upper part of eye bright red.

Remarks.—This new species differs from the only other species referred to the genus *Saccoderma* as indicated in the following key:

1*a*. Black pigment at tips of first to fourth or fifth branched rays of dorsal and anal fins; caudal spot bluntly rounded posteriorly when caudal fin is fully spread, and ending abruptly and not continuing halfway out to tips of middle rays; pelvic insertion equidistant between snout tip and base of last anal ray to half a snout length behind anal base.

Saccoderma melanostigma, new species

1*b*. Black pigment cells evenly distributed on outer third of nearly all branched rays of dorsal and anal fins; caudal spot ending in a blunt point about halfway out on middle caudal fin rays; pelvic insertions equidistant between tip of snout and a snout length behind base of anal fin.

Saccoderma hastata (Eigenmann)

Named *melanostigma* in reference to the black caudal spot.

Genus ODONTOSTILBE Cope

Odontostilbe Cope, Proc. Amer. Philos. Soc., vol. 11, p. 566, fig. 4, 1870. (Type, *Odontostilbe fugitiva* Cope.)

ODONTOSTILBE PULCHER (Gill)

Poecilurichthys pulcher Gill, Ann. Lyc. Nat. Hist. New York, vol. 6, p. 59, 1858 (Trinidad).

Chirodon (*Odontostilbe*) *pulcher* Lütken, Vid. Medd. Naturh. Foren. Kjøbenhavn, Nos. 12–16, p. 238, 1874 (locality ? [Venezuela]).

Odontostilbe pulcher EIGENMANN, Indiana Univ. Stud., vol. 7, No. 44, p. 9, 1920 (Maracay, Río Bue, Venezuela).

A specimen, 41.5 mm., from Caripito, Venezuela, 1942, collected by Dr. William Beebe, was lent to me for identification and report.

CHEIRODONTOPS, new genus

Genotype.—Cheirodontops geayi, new species.

This new genus is characterized by its teeth, shown in figure 43, which resemble those of *Holoshesthes* Eigenmann. *Cheirodontops* differs from that genus in lacking all traces of teeth on the maxillaries. The premaxillary teeth have three prominent points, the middle one longest, then on side near base of each outer enlarged point is a minute denticle. The dentary has broader incisorlike teeth, with 3 equally enlarged points fused together with almost a straight cutting edge, and near base of each outer point is a minute denticle (fig. 43).

Lateral line complete; adipose fin present; caudal fin with scales only at base and no saclike organ at base of caudal fin. Other characters of this new genus are those of the new species described below.

This new genus may be separated from all other genera referred to the subfamily Cheirodontinae, with a complete lateral line, by the shape of the premaxillary and dentary teeth, except *Holoshesthes* Eigenmann. The latter genus has teeth on the maxillary, but these are lacking on *Cheirodontops*. *Atopomesus* Myers and *Othonocheirodus* Myers have teeth on the maxillary. Although *Amblystilbe* Fowler has no teeth on the maxillary, all its teeth are tridentate, small, and similar in both jaws. This new genus runs down through the key by Eigenmann (Mem. Carnegie Mus., vol. 7, No. 1, pp. 15-17, 1915) to "*Holesthes*" (=*Holoshesthes*) but differs as indicated above. The teeth in upper and lower jaws of *Odontostilbe* Cope are similar, while they differ in these jaws in *Cheirodontops*.

CHEIRODONTOPS GEAYI, new species

FIGURES 42, 43

Holotype.—U.S.N.M. No. 121507, a specimen 37.3 mm. in standard length, collected in the Río Guárico and tributaries between San Sebastián and San Casimiro, Estado de Aragua, Venezuela, by L. P. Schultz, G. Zuloaga, William Phelps, Jr., and R. Sherman, May 12, 1942.

Paratypes.—U.S.N.M. No. 121508, 6 examples, 35 to 40 mm., taken along with the holotype and bearing same data.

Description.—This description is based on the types listed above. Detailed measurements were made on the holotype and on one paratype, and these data, expressed in hundredths of the standard length,

are recorded below, first for the holotype, then for the paratype in parentheses. Standard length in millimeters 37.3 (35.5).

Length of head 24.1 (24.2); greatest depth of body 33.5 (27.1); length of snout 5.90 (6.20); diameter of eye 8.04 (7.89); distance from tip of snout to end of maxillary 7.77 (8.74); width of interorbital space 7.50 (7.60); postorbital length of head 11.3 (11.3); least depth of caudal peduncle 11.3 (10.4); length of caudal peduncle 16.4 (16.3);

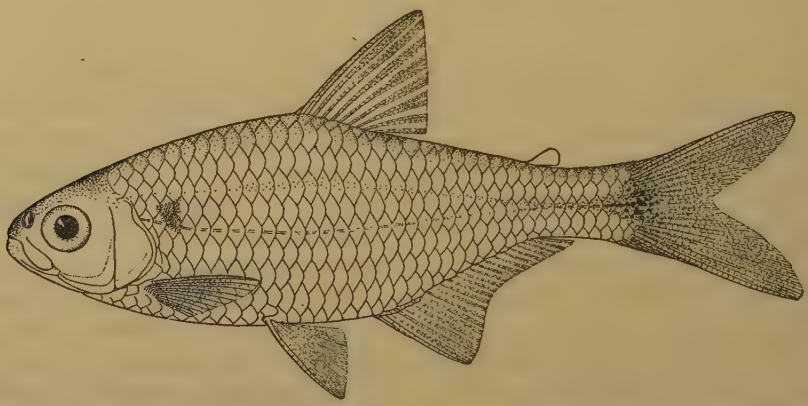

FIGURE 42.—*Cheirodontops geayi*, new genus and species: Holotype, U.S.N.M. No. 121507, 37.3 mm. in standard length.

FIGURE 43.—*Cheirodontops geayi*, new genus and species: *a*, Premaxillary tooth; *b*, mandibular tooth.

length of base of anal fin 28.4 (28.2); length of longest anal ray 17.7 (17.5); longest dorsal ray 25.7 (28.2); longest pectoral ray 19.3 (19.2); longest pelvic ray 17.4 (21.7); length of upper caudal fin lobe 28.1 (27.6) and of lower caudal lobe 29.2 (28.2); distance from snout tip to dorsal origin 51.0 (49.6); snout to adipose origin 83.9 (84.0); snout to anal origin 60.8 (58.6); snout to pectoral insertion 23.1 (22.6); snout to pelvic insertion 44.2 (40.9); snout to anus 56.8 (55.0); dorsal origin to midcaudal fin base 56.0 (56.0); dorsal origin to tip of adipose fin 41.6 (43.7).

The following counts were made: Dorsal fin rays ii, 9 (ii, 9; ii, 9; ii, 9; ii, 9; ii, 9; ii, 9); anal iii, 22 (iii, 20; iii, 21; iii, 21; iii, 21; iii, 22; iii, 22); pectoral i, 11–i, 11 (i, 11–i, 11; i, 11–i, 11; i, 11–i, 11; i, 11–i, 11; i, 10–i, 10; i, 10–i, 10); pelvic i, 7 on both sides of all specimens; branched caudal fin rays always 17; scale rows from upper edge of gill opening to base

of caudal fin 37 (36; 36; 35; 36; 37; 36); scales above lateral line 5 and from lateral line to pelvic insertions 4; scales in front of dorsal 11 (12; 12); 3 scales bordering the supraoccipital process; premaxillary teeth always 6 on each side and on each side of the dentary 4 enlarged teeth at front of jaw then 6 smaller ones posteriorly; gill rakers about 8+14.

Body compressed, depth 3.0 to 3.4, head 4.1 to 4.3 in standard length; snout a little shorter than eye, about 3.8 to 4, and eye 3.0 to 3.2 in head; interorbital space convex, its width equal to eye; second suborbital covering cheek, so that little or no naked area occurs between its ventral and posterior margins and the preopercle; mouth terminal, oblique, the lower jaw about equal to upper, snout not projecting in front of lower jaw; the maxillary without teeth, reaching to under front of eye but not quite to under front of pupil; gill membranes free from isthmus, continued forward; lateral line complete; adipose fin well developed; gill rakers short, pointed, about 8+14 on the first arch; supraoccipital process short, bordered by three scales, usually not quite all the third scale; breast and predorsal area normally and evenly scaled; dorsal origin in front of middle of standard length, closer to tip of snout by postorbital length of head; origin of anal fin equidistant between base of caudal fin and rear edge or middle of second suborbital; scales along base of anal rays anteriorly; anal origin under base of last dorsal ray; pelvic insertions a little more than width of pupil in front of a vertical line through dorsal origin; in females the pectorals not quite reaching to pelvic bases and pelvic fins not quite to anal origin; in males the last simple ray of the dorsal and the simple first ray of pelvics elongate, more or less filamentous, so that the latter reaches past anal origin, but the pectorals not reaching past pelvic insertions; adipose origin over bases of about second or third from last anal rays; length of base of anal fin greater than the distance between rear base of dorsal fin and adipose origin; caudal fin deeply forked; distal margin of anal fin concave, first rays longest; distal margin of dorsal truncate except for the elongated last simple ray of males; margins of pectorals and pelvics a little rounded; the teeth fundamentally 5-pointed, but the two outer points minute and sometimes represented by rounded knobs; always 6 teeth on each premaxillary or 12 teeth in the jaw; the premaxillary teeth (fig. 43) differing from the teeth on the dentary considerably, the former having the middle point longest, but on the dentary all three of the middle points of the same length with straight sides; the dentary teeth on each side numbering 4 enlarged ones at front of jaw, then 6 smaller ones set off by a sharp angle posteriorly; interhaemals not projecting on lower side of the caudal peduncle.

Color, in alcohol, pale with a silvery band posteriorly, sometimes blackish, ending in a dark, caudal spot; margins of scales on back outlined with black pigment cells; top of head behind orbits blackish; snout and tip of chin somewhat speckled with black pigment cells; small dark humeral spot more or less developed; peritoneum silvery with widely spaced black pigment cells; cheeks and isthmus silvery.

Remarks.—This new species differs from all other characinids referred to the subfamily Cheirodontinae that have complete lateral lines and lack a saclike dermal organ, in the shape of its teeth, which are unlike in upper and lower jaws. It is nearest to the genus *Holoshesthes* but differs in lacking teeth on the maxillary.

Named *geayi* in honor of the French writer F. Geay, who in 1896–97 reported on the fisheries of the Orinoco Basin in his work "Pêches dans les Affluentes de l'Orinoque."

Genus GEPHYROCHARAX Eigenmann

Gephyrocharax EIGENMANN, Indiana Univ. Bull., vol. 10, No. 8 (Indiana Univ. Stud. No. 16), p. 23, 1912. (Type, *Gephyrocharax chocoensis* Eigenmann.)

The frontal fontanel was observed to be variously developed, becoming reduced with increase in size. Its variance among the several species was too great to use it as a major character in the following key as was done by Eigenmann and Myers (Mem. Mus. Comp. Zool., vol. 43, No. 5, p. 477, 1929):

KEY TO THE SPECIES OF GEPHYROCHARAX

1*a*. Outer caudal rays black, this black pigment joining with black caudal spot; middle rays of caudal fin pale; a darkish humeral spot only slightly developed; lower lip thin, not fleshy at symphysis (both slopes of Panama). **Gephyrocharax atracaudatus** Meek and Hildebrand

1*b*. Outer caudal rays pale.

2*a*. A dark spot at base of first dorsal rays; tips of pectorals usually black in males; a dark caudal spot and a dark humeral bar (Magdalena Basin, Colombia) ---------- **Gephyrocharax melanocheir** Eigenmann

2*b*. No black area at base of dorsal fin rays.

3*a*. Black caudal spot, if present, not continuing as a black band or streak to end of middle caudal fin ray.

4*a*. No humeral blackish bar or spot, a collection of dark chromatophores sometimes visible but never forming a distinct vertical bar or spot; the dark caudal spot more or less present, but when best developed not blackish; an underlaid silvery leaden axial streak, most distinct along side of tail.

5*a*. Origin of dorsal an equal distance between base of caudal fin and opercle; caudal spot somewhat developed, darkish but fading on basal middle caudal fin rays; depth 3.4 to 4 (Río Chapore, Bolivia) ---------- **Gephyrocharax chaporae** Fowler

5*b*. Origin of dorsal fin equidistant between base of caudal fin and rear of operculum to a half eye diameter behind head; no humeral spot; depth about 3.0 to 3.75.

6*a*. Caudal spot obsolete; fontanel extending to between middle of interorbital space (Lake Valencia; upper Río Guárico drainage; Caripito, Venezuela)---- **Gephyrocharax valencia** Eigenmann

6*b*. Caudal spot developed but not prominent; fontanel not extending quite to middle of interorbital space (San Juan and Atrato Basins, Colombia)--- **Gephyrocharax chocoensis** Eigenmann

4*b*. A blackish humeral bar or spot distinctly present; caudal spot present.

7*a*. Depth 4 in standard length; a distinct lateral streak more prominent posteriorly; dorsal origin an equal distance between midbase of caudal fin and a point about equal to postorbital length of head behind head; on males ventral margin of belly blackish from in front of pelvics to anal origin (Cauca Basin, Colombia).

Gephyrocharax caucanus Eigenmann

7*b*. Depth 2.9 to 3.5.

8*a*. Caudal spot followed by a whitish area near base of rays on each lobe of caudal fin, but black caudal spot not continuing as a black band on middle caudal fin rays.

9*a*. Lower lip thin; pectorals not quite reaching to middle of pelvics; profile from snout to occiput slightly convex, a definite offset at mouth (Panama).

Gephyrocharax intermedius Meek and Hildebrand

9*b*. Lower lip thickened and more or less with a fleshy knob at symphysis; pectorals reaching to or a little beyond middle of pelvics; profile from tip of snout to occiput straight, no offset at mouth (Río Chame, Panama).

Gephyrocharax whaleri Hildebrand

8*b*. Caudal spot not followed by a whitish area at each side at base of caudal fin rays, and usually not prominently developed; origin of dorsal equidistant between caudal base and vertical through opercle to preopercular edge (Río Beni, Bolivia).

Gephyrocharax major Myers

3*b*. Caudal spot blackish and continuing as a black band to posterior end of middle caudal fin rays; but fading some posteriorly; outer base of each lobe of caudal fin with orange spot, whitish in alcohol; lips thin (Maracaibo Basin)---------- **Gephyrocharax venezuelae**, new species

GEPHYROCHARAX VALENCIA Eigenmann

SARDINA

Gephyrocharax valencia EIGENMANN, Indiana Univ. Stud., vol. 7, No. 44, p. 11, 1920 (Isla del Buro, Lake Valencia; Maracay, Río Bue; Lake Valencia, Maracay).—PEARSE, Univ. Wisconsin Stud., No. 1, p. 21, 1920 (mouth Río Bue, Maracay, Lake Valencia).—EIGENMANN and MYERS, Mem. Mus. Comp. Zool., vol. 43, No. 5, p. 484, 1929 (Isla del Buro, Lake Valencia; Maracay, Río Bue; Maracay, Lake Valencia).

The following specimens, referred to this species, considerably extend its range:

U.S.N.M. No. 92189, 16 specimens, 28 to 37.8 mm. from Barquisimeto, Venezuela.

U.S.N.M. No. 93111, 4 specimens, 26 to 28.5 mm. from Lake Valencia, Venezuela, collected by International Health Board.

U.S.N.M. No. 121325, 5 specimens, 30 to 37 mm., collected in the Río Guárico and tributaries between San Sebastián and San Casimiro, Estado de Aragua, by

Leonard P. Schultz, Guillermo Zuloaga, Roger Sherman, and William H. Phelps, Jr., May 12, 1942.

The following collections, made by Dr. William Beebe, were lent to the author for study and report:

Three specimens, 25 to 27 mm., Río San Pablo, near Caripito, Venezuela, April 11, 1942.

One specimen, 26 mm., from Caripito, Venezuela, 1942.

Two specimens, male of 35 mm., female of 36 mm., from Caripito, Venezuela, 1942.

GEPHYROCHARAX VENEZUELAE, new species

FIGURE 44

Holotype.—U.S.N.M. No. 121369, a male specimen 32.5 mm. in standard length, collected in the Río San Juan at the bridge south of Mene Grande, Motatán system, by Leonard P. Schultz, March 20, 1942.

Paratypes.—The following collections were made by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121361, 25 specimens, 23.5 to 37 mm., taken along with the holotype and bearing same data.

U.S.N.M. No. 121367, 6 examples, 21 to 28 mm., taken in the Río San Juan, 12 km. south of Rosario, February 26.

U.S.N.M. No. 121368, 107 examples, 19 to 32.5 mm., collected March 16 in the Río Machango at the bridge south of Lagunillas.

U.S.N.M. No. 121362, 11 specimens, 22 to 35 mm., taken February 21 in the Río Palmar near Totuma, about 100 km. southwest of Maracaibo.

U.S.N.M. No. 121359, a specimen, 24.5 mm., collected February 26 in the Río Apón about 35 km. south of Rosario, Maracaibo Basin.

U.S.N.M. No. 121366, 134 examples, 21 to 28 mm., obtained from the Río Negro below mouth of Río Yasa, Maracaibo Basin, March 2.

U.S.N.M. No. 121363, 11 specimens, 21 to 42 mm., collected March 25 in the Río Motatán, 4 km. above Motatán.

U.S.N.M. No. 121360, an example, 23.5 mm., collected March 12 near the mouth of Caño de Sagua, 35 km. north of Sinamaica (water salty on incoming tide).

U.S.N.M. No. 121365, 22 specimens, taken March 24 in the Río Motatán, 8 km. below Motatán.

U.S.N.M. No. 121364, 41 specimens, 19 to 32 mm., collected March 17 in the Río Motatán at the bridge 22 km. north of Motatán.

U.S.N.M. No. 121533, 3 specimens, 24.5 to 30 mm., from Río San Pedro at bridge south of Mene Grande, March 20.

Description.—Detailed measurements were made on the holotype and one paratype, these data, recorded in hundredths of the standard length, are given below, first for the holotype, then the paratype. Standard length in millimeters 32.5 and 32.5.

Length of head 24.3 and 23.7; greatest depth 31.1 and 30.5; length of snout 7.08 and 7.08; diameter of eye 8.37 and 8.00; width of interorbital space 8.92 and 9.23; postorbital length of head 10.1 and 11.1; length from tip of snout to rear of maxillary 10.8 and 9.84; length of caudal peduncle from base of last anal ray to midbase of caudal fin

12.3 and 11.1; least depth of caudal peduncle 11.4 and 11.8; length of longest ray of anal fin 16.9 and 14.8; of dorsal 20.9 and 20.0; of pectoral 23.4 and 24.0; of pelvics 16.9 and 12.6; length of longest ray of upper lobe of caudal fin 29.2 and 27.7; of lower lobe 27.7 and 29.2; distance from tip of snout to dorsal origin 64.6 and 61.6; snout to anal origin 60.0 and 58.4; snout to adipose origin 88.9 and 87.1; snout to pelvic insertion 45.8 and 44.0; snout to pectoral insertion 28.3 and 25.5; snout to anus 55.3 and 55.4.

FIGURE 44.—*Gephyrocharax venezuelae*, new species: Holotype, U.S.N.M. No. 121369, 32.5 mm. in standard length.

The following counts were made, respectively: Anal rays v, 28; v, 29 and v, 28; dorsal ii, 8; ii, 8 and ii,8; pectoral i, 9–i, 9; i, 8; i, 8–i, 8; pelvic i, 6–i, 6; i, 6; i, 6–i, 6; scales 40; 40; 40; scales from dorsal origin to lateral line 6; 6; 5; below lateral line to anal origin 5½; 5; 5; scales in front dorsal 18; 22; dorsal origin over fifth branched ray of anal fin; about 5 or 6+10 gill rakers on first gill arch. Additional counts recorded in table 20.

Body and head compressed, the greatest depth near insertion of pelvic fins; profile of back in front of dorsal fin straight; ventral profile greatly curved; mouth nearly vertical, lower jaw projecting but not quite entering profile; snout shorter than diameter of eye; maxillary reaching a little past front of eye; belly in front of pelvics rounded but midventral line behind pelvics with a keel, anus a little in advance of origin of anal fin; adipose fin present, small, its origin over base of about second or third from last rays of anal fin; origin of dorsal fin almost equidistant between rear of head and midbase of caudal fin; pectoral fins pointed, reaching to end of first quarter or first third of the length of the pelvics, the latter reaching to anal origin; first few branched rays of anal fin longest sometimes with tiny teeth distally; margin of dorsal fin rounded; interorbital space rounded, with a shallow groovelike depression, somewhat glandular, each side of interorbital space over orbits; a fontanel occurs along middorsal line

of head from between a line through back of pupils, expanding at the supraoccipital; the latter ends in a point; lateral line decurved forward thence below middle of sides to base of caudal fin.

Teeth on premaxillary in two distinct series, 5 in the inner series of each side and 4 smaller ones on the outer side, a single tooth on the maxillary; teeth with a median triangularly pointed cusp and one or two tiny cusps on each side at base of median cusp. Four similar teeth on each side of lower jaw.

Color.—A blackish humeral bar or spot set off by a paler area above and at side of it; sides of body speckled with black pigment cells; a black line, extending along axis of body above the lateral line more intense posteriorly; a large blackish caudal spot at rear of caudal peduncle, this continuing as a black band to the distal end of the middle rays of caudal fin; middle of back with a narrow blackish band of pigment cells from occiput to dorsal origin, thence dividing and passing along each side of base of dorsal fin, becoming more diffuse on dorsal side of caudal region; all fins with scattered black pigment cells but none of these in spots or streaks; upper lip, lower lip, and chin heavily pigmented; cheek and opercle silvery. When alive, the base of the caudal fin at each side of the black band on middle rays of caudal fin with a bright orange or crimson spot; dorsal side of each eye with a bright orange spot.

Remarks.—This new species differs from all other species referred to the genus *Gephyrocharax* in having the black caudal spot continuing as a black band along middle rays of caudal fin to end of that fin. The key on pages 322–323 will serve to identify all species in the genus *Gephyrocharax*.

Named *venezuelae* after the country by that name.

TABLE 20.—*Counts made on species of* Gephyrocharax *from Venezuela*

Species	Number of fin rays													Number of scales											
	Branched rays of anal						Dorsal			Pectoral			Pelvic	Along sides				Above lateral line				Below lateral line				
	25	26	27	28	29	30	ii, 7	ii, 8	ii, 9	i, 8	i, 9	i, 10	i, 5	i, 6	39	40	41	42	5	5½	6	6½	5	5½	6	6½	7
valencia	1	4	11	5	5	--	1	4	---	---	5	1	---	6	--	--	--	4	--	---	2	1	--	---	2	---	1
venezuelae	--	1	2	5	3	2	---	6	1	4	5	---	1	10	1	5	1	--	1	1	2	---	3	1	--	---	--

Genus CTENOBRYCON Eigenmann

Ctenobrycon EIGENMANN, Bull. Mus. Comp. Zool., vol. 52, p. 94, 1908. (Type, *Tetragonopterus hauxwellianus* Cope.)

Apodastyanx FOWLER, Proc. Acad. Nat. Sci. Philadelphia, vol. 63, p. 422, 1911. (Type, *Apodastyanax stewardsoni* Fowler, a specimen without pelvic fins.)

CTENOBRYCON SPILURUS (Valenciennes)

Tetragonopterus spilurus Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 22, p. 156, 1849 (Surinam).

Apodastyanax stewardsoni Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 63, p. 422, 1911 (Corisal, Venezuela).

Ctenobrycon spilurus Eigenmann, Mem. Mus. Comp. Zool., vol. 43, No. 4, p. 335, 1927 (Surinam to Venezuela along coast).

CREAGRUTOPS, new genus

Genotype.—*Creagrutops maracaiboensis*, new species.

This new genus, *Creagrutops*, is a *Creagrutus* without a complete lateral line and may be distinguished from that genus and also from *Creagrudite* Myers by its incomplete lateral line of about 9 or 10 pores. *Creagrutops* has tricuspid teeth arranged as shown in figure 46. This arrangement in 3 irregular rows on the premaxillary is practically the same as on *Creagrutus* Günther and on *Creagrudite* Myers, its only near relatives known to me at this writing.

Other characters of this new genus are those of the new species described below.

CREAGRUTOPS MARACAIBOENSIS, new species

Figures 45, 46

Holotype.—U.S.N.M. No. 121531, a specimen 22 mm. in standard length, collected by Leonard P. Schultz in the Río Negro below mouth of Río Yasa, March 2, 1942.

Paratypes.—U.S.N.M. No. 121532, 48 specimens, 11 to 22 mm., taken along with the holotype and bearing same data.

Females at 22 mm. standard length contain mature eggs of a rather large size for such a small fish.

Description.—The description is based on the types listed above. Detailed measurements were made on the holotype and one female paratype, and these data, expressed in hundredths of the standard length, are recorded first for the holotype, then the paratype in parentheses. Standard length in millimeters 22 (21.6).

Length of head 27.8 (29.2); greatest depth 29.5 (30.2); length of snout 6.84 (7.40); diameter of eye 10.9 (11.6); tip of snout to rear of maxillary 9.55 (9.72); width of interorbital space 8.19 (9.26); postorbital length of head 12.3 (12.9); least depth of caudal peduncle 12.3 (11.6); length of caudal peduncle 21.4 (19.9); length of base of anal fin 20.0 (19.9); length of longest ray of anal fin 20.0 (19.9); longest dorsal ray 25.0 (24.1); longest pectoral ray 20.5 (19.5); longest pelvic ray 16.8 (16.2); length of upper caudal fin lobe 28.7 (29.6) and of lower lobe 27.7 (29.6); distance from tip of snout to dorsal fin origin 52.8 (54.6); snout to adipose origin 83.7 (84.7); snout to anal origin 61.4 (68.5); snout to pectoral insertion 27.3 (28.7); snout to pelvic

insertion 47.8 (53.2); distance from dorsal origin to midcaudal fin base 52.3 (51.4); dorsal origin to tip of adipose fin 42.8 (41.7).

The following counts were made, respectively: Dorsal rays ii, 8 (ii, 8); anal iii, 11 (iii, 12); pectoral i, 11–i, 11 (i, 11–i, 11); pelvic i, 6–i, 6 (i, 6–i, 6); scales 31 (31); scales above lateral line 5 (5) and below lateral line to pelvic insertion 4 (4); scales in front of dorsal fin to tip of supraoccipital process 10 (10); scales bordering one side of supraoccipital process 2½ (3); number of teeth and their arrange-

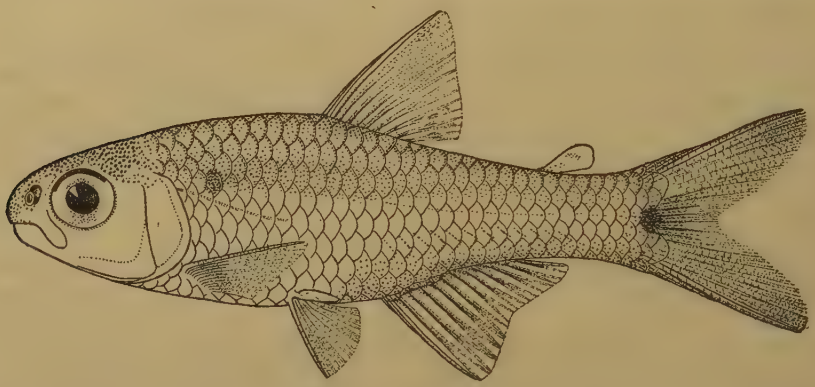

FIGURE 45.—*Creagrutops maracaiboensis*, new genus and species: Holotype, U.S.N.M. No. 121531, 22 mm. in standard length.

FIGURE 46.—*Creagrutops maracaiboensis*, new genus and species: Arrangement of teeth on premaxillaries and on maxillaries.

ment in upper jaw as shown in figure 46, teeth on mandible 6 on each side.

A summary of my counts is recorded in table 21.

TABLE 21.—*Counts made on* Creagrutops maracaiboensis

Number of fin rays								Number of scales						
Dorsal	Anal		Pectoral			Pelvic		Head to mid-caudal base	Pores in lateral line		Above lateral line	Below lateral line	In front of dorsal fin	
ii, 18	iii, 11	iii, 12	i, 10	i, 11	i, 12	i, 6	i, 7	31	9	10	5	4	10	11
11	3	8	2	6	4	6	8	5	3	3	5	5	7	1

Body a little compressed, the head about 3½ and depth 3.0 to 3.2 in standard length; snout ⅔ eye and about 4 in head; eye large, 2½ in head; interorbital a little convex, not quite so wide as eye, about 3 in head; postorbital length of head twice in distance from dorsal origin to tip of supraoccipital; second suborbital not covering cheek, posteriorly and ventrally naked, so that it does not come in contact with preopercle; gill rakers represented by tiny knobs along first gill arch; lateral line incomplete, usually with only 9 or 10 pores and ending about opposite pelvic insertions; a large fontanel occupying middorsal area of head from between rear of orbits to tip of supraoccipital; lower jaw included, shorter than upper, so that snout projects a little and the outer teeth of premaxillary are exposed; gill membranes free from isthmus, joined to it far forward; predorsal and preventral area normally and evenly scaled; origin of dorsal fin about an equal distance from snout tip and midcaudal fin base; pelvic insertions in front of a vertical through origin of dorsal fin; anal origin usually about under base of the third from last dorsal ray; adipose fin present, a vertical through its origin passing a little behind base of last anal ray; anal origin an equal distance between midcaudal base and preopercle; caudal fin forked, its base with a few scales, but no pouch or enlarged scales are developed; distal margin of anal fin a little concave; the last simple rays of dorsal and of anal fins on males a little elongate; intestine with a few pyloric caeca.

Color, in alcohol: Middle rays of caudal fin blackish, forming an elongate caudal spot that ends before reaching tips of middle caudal fin rays and not extending on the caudal peduncle; tips of each caudal lobe a little dusky, as is tip of dorsal first rays occasionally; a line of black pigment along the anterior margin of each anal ray; tip of snout with black pigment cells and also upper parts of head; margins of each scale pocket, dorsally, outlined with a little black pigment; numerous scattered black pigment cells over anal base to midaxis of body and lower side of caudal peduncle; no humeral spot. When alive, this species had a reddish coloration on the upper third of the eye. Peritoneum silvery, with a few scattered black pigment cells at sides dorsally.

Remarks.—This new species differs from all other characinids with three irregular rows of tricuspid teeth on the premaxillary and a single row on the dentary by having an incomplete lateral line and, in addition, no humeral spot, the caudal spot being confined to the base of caudal fin.

Named *maracaiboensis* in reference to the drainage basin in which it was collected.

Genus CREAGRUTUS Günther

Creagrutus GÜNTHER, Catalogue of the fishes in the British Museum, vol. 5, p. 339, 1864. (Type, *Creagrutus mülleri* Günther = *Leporinus mülleri* (non Steindachner) Günther, 1859.)

Although Eigenmann revised this genus in 1927 and Myers in the same year split off the genus *Creagrudite*, considerable work needs to be done on these genera before they are well understood. In fact, I cast serious doubt on the distinctness of *Creagrudite* from *Creagrutus* but am unable to reach a definite conclusion at this time because of lack of specimens. Most of the specimens from Venezuela have the teeth in the upper jaws arranged as shown in figure 48, but there is some variation.

KEY TO THE SPECIES OF CREAGRUTUS FROM VENEZUELA

1*a*. A black spot at base of middle rays of caudal fin, pigment not embedded; humeral bar, usually with intensification of blackish pigment at midaxis, this bar not crescent shaped; dorsal origin over or a little in front of a vertical line through pelvic insertion; usually 10 scales (occasionally 9 and 11) between dorsal origin and tip of supraoccipital process; anal rays iii, 10 to iii, 12; depth 3¼ to 3⅖ and head 3⅓ to 3½, in standard length; eye 3 to 3½ in head; when alive dorsal side of eye reddish.

Creagrutus hildebrandi, new species

1*b*. No black pigment spot at base of midcaudal fin rays.

2*a*. Humeral bar crescent-shaped, with concavity anteriorly [28]; adipose origin over base of last dorsal ray; scales 37 or 38; anal rays iii, 9 or iii, 10.

3*a*. Head 4⅕, depth 4⅕, in standard length; dorsal origin directly over pelvic insertion; anal origin under tips of depressed last dorsal ray; second suborbital equals eye; crescent-shaped humeral bar over a black humeral spot; anal 11 (probably iii, 10) ..**Creagrutus phasma** Myers

3*b*. Head 3⅔ to 4, depth 3⅓ to 4 in standard length; dorsal origin directly over to a little in front of pelvic insertion; anal origin under a third to a half of the way out depressed last dorsal ray; width of second suborbital equals ⅔ eye; no black spot in crescent-shaped humeral bar; anal rays iii, 9, rarely iii, 8 or iii, 10.....**Creagrutus bolivari**, new species

2*b*. Humeral bar not crescent-shaped; head 3⅓ to 4, depth 3 to 3½, in standard length; anal rays iii, 10 or iii, 11, occasionally iii, 12; usually 11 scales in front of dorsal origin; adipose origin over a vertical through half the way out depressed last anal ray; origin of dorsal usually a little behind or sometimes over pelvic insertions; dorsal origin an equal distance between snout tip and one-fourth to one-third eye diameter behind adipose tip.....**Creagrutus beni** Eigenmann

CREAGRUTUS HILDEBRANDI, new species

FIGURES 47, 48

Holotype.—U.S.N.M. No. 121482, a specimen 50 mm. in standard length, taken by Leonard P. Schultz, April 1, 1942, in the Río Táchira, 7 km. north of San Antonio, Catatumbo system, Venezuela.

[28] The shape of the humeral bar and elongate shape of the body are very similar to pl. 45, fig. 1, Mem. Carnegie Mus., vol. 5, 1912 and pl. 34, fig. 2, Mem. Mus. Comp. Zool., vol. 43, pt. 4, 1927, both of *Creagrutus melanzonus*.

Paratypes.—All the following collections were made by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121491, 10 specimens, 31 to 65 mm. in standard length, taken along with the holotype and bearing same data.

U.S.N.M. No. 121496, 403 examples, 28 to 63 mm., Río Motatán, 4 km. above Motatán, March 25.

U.S.N.M. No. 121494, 261 examples, Río Motatán at bridge, 22 km. north of Motatán, March 17.

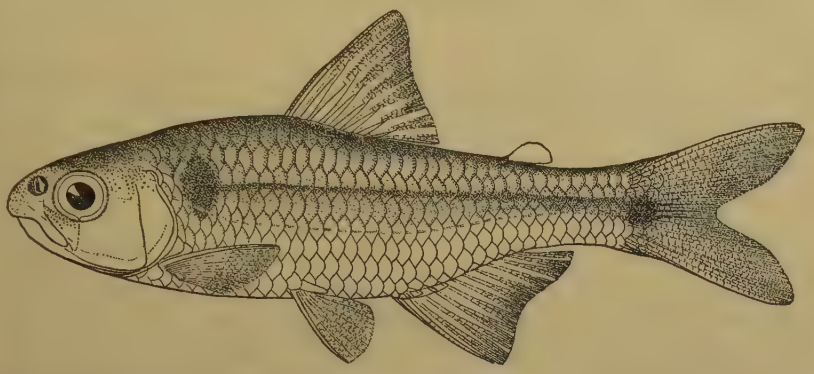

FIGURE 47.—*Creagrutus hildebrandi*, new species: Holotype, U.S.N.M. No. 121482, 50 mm. in standard length.

FIGURE 48.—*Creagrutus hildebrandi*, new species: Arrangement of teeth on premaxillaries and on maxillaries.

U.S.N.M. No. 121485, 97 specimens, 20 to 58 mm., Río Jimelles, 12 km. east of Motatán, Motatán system, March 24.

U.S.N.M. No. 121495, 16 specimens, 19 to 26 mm., Río Palmar at bridge, 70 km. southwest of Maracaibo, March 6.

U.S.N.M. No. 121484, 20 examples, 24 to 45.5 mm., Río San Juan near bridge, Motatán system, March 17–20.

U.S.N.M. No. 121483, a 28-mm. example, Río San Pedro at bridge, Motatán system, March 20.

U.S.N.M. No. 121492, 66 specimens, 18 to 44.5 mm., Río Machango at bridge south of Lagunillas, March 16.

U.S.N.M. No. 121488, 159 specimens, 13 to 45 mm., Río Negro below mouth of Río Yasa, March 2.

U.S.N.M. No. 121486, 334 specimens, 14 to 40 mm., Río Apón about 35 km. south of Rosario, February 26.

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U.S.N.M. No. 121489, 154 examples, 15 to 47 mm., Río Socuy, 3 km. above mouth, February 24.

U.S.N.M. No. 121487, 229 specimens, 16 to 54 mm., Río Palmar near Totuma, about 100 km. southwest of Maracaibo, February 21.

U.S.N.M. No. 121490, 148 specimens, 20 to 49 mm., Río Motatán, 8 km. below Motatán, March 24.

U.S.N.M. No. 121493, 11 examples, 17 to 35.5 mm., Río Machango, 20 km. above bridge, south of Lagunillas, March 21.

This species occupies the rapidly flowing waters of the middle and lower parts of the rivers.

TABLE 22.—*Counts and measurements made on species of* Creagrutus (*all measurements expressed in hundredths of the standard length*)

Characters	Species			
	hildebrandi		*bolivari*	
	Holotype U.S.N.M. No. 121482	Paratype U.S.N.M. No. 121491	Holotype U.S.N.M. No. 121497	Paratype U.S.N.M. No. 121498
Standard length (in mm.)	50.0	39.5	50.5	38.7
Length of head	27.2	29.6	26.5	27.1
Greatest depth of body	29.0	27.3	29.7	27.1
Length of snout	7.8	8.6	7.72	7.75
Diameter of eye	9.0	11.6	8.91	9.05
Length of mouth	11.0	12.4	10.5	11.1
Width interorbital	9.0	8.1	8.51	9.05
Postorbital length of head	12.6	12.7	13.7	12.1
Least depth of caudal peduncle	12.8	11.1	12.1	11.9
Length of caudal peduncle	11.0	22.5	24.0	23.8
Length of base of anal	21.0	19.8	16.6	15.0
Length of longest anal ray	18.8	19.0	18.2	17.6
Length of longest dorsal ray	22.8	19.0	18.4	20.7
Length of longest pectoral ray	20.8	20.2	19.6	19.4
Length of longest pelvic ray	15.4	16.5	17.4	15.5
Length of upper caudal fin lobe	31.0	30.1	26.0	27.6
Length of lower caudal fin lobe	31.0	29.6	26.0	25.8
Distance from snout to dorsal origin	46.4	45.0	47.7	47.8
Distance from snout to adipose origin	80.8	80.5	78.2	80.1
Distance from snout to anal origin	63.2	61.8	63.5	65.9
Distance from snout to pectoral insertion	25.2	25.8	24.8	25.3
Distance from snout to pelvic insertion	46.4	46.6	47.7	48.8
Distance from snout to anus	58.2	51.9	56.4	57.4
Dorsal rays	ii, 8	ii, 8	ii, 8	ii, 8
Anal rays	iii, 11	iii, 11	ii, 9	ii, 9
Pectoral rays	i, 12–i, 12	i, 12–i, 13	i, 13–i, 13	i, 12–i, 12
Pelvic rays	i, 7–i, 8	i, 7–i, 7	i, 7–i, 7	i, 7–i, 7
Branched caudal rays	17	17	17	17
Number of gill rakers on first gill arch	----------	5+10	----------	6+11
Number of scales on sides	37	36	38	38
Scales above lateral line	5	5	5	5
Scales below lateral line	3	3	3	3
Scales in front of dorsal fin	9	10	9	9

Description.—This description is based on the holotype and paratypes listed above. Measurements were made on the former and

one of the latter, and these data, recorded in hundredths of the standard length, are presented in table 22.

Body somewhat compressed, depth 3¼ to 3⅜ and head 3⅜ to 3½ in standard length; snout bluntly rounded; lower jaw included, the snout projecting so that the two most anterior teeth of premaxillary show on underside of snout when mouth is closed; mouth when closed a trifle above level of lower edge of eye; maxillary extending a little past a vertical through front of eye, but not quite to one through front of pupil; width of second suborbital about two-thirds eye, covering about one-half of the cheek and ventrally or posteriorly not in contact with preopercle; interorbital space convex, about equal to eye; eye diameter a little greater than length of snout; the ventral profile usually a little more curved than the dorsal profile; the greatest depth at origin of dorsal fin; nasal openings separated by a flap of skin and a small papilla projects backward from the front of margin of anterior nasal opening; dorsal origin usually over or a little in front of a vertical line through pelvic insertions; a vertical line through anal origin passing through a point about two-thirds the way out the depressed last anal ray; a vertical line through adipose origin passing a very little behind base of last anal ray; caudal peduncle longer than base of anal fin; gill rakers 5 or 6+9 or 10 on first gill arch, those on upper part of the arch much smaller than those on lower part of the arch; gill membranes free from isthmus; lateral line complete, decurved a little anteriorly; teeth on the premaxillary arranged as shown in figure 48 and those on mandible in a single row of about 5 tricuspid teeth on each side; breast and predorsal area evenly and normally scaled; length of pectorals not quite reaching or extending a little past pelvic insertions; pelvic fins usually reaching to anal origin; distal margin of dorsal fin truncate to a little concave; distal margin of anal fin a little concave; outer margins of paired fins a little convex; caudal fin deeply forked; lobes of caudal fin scaled out as far as two-fifths their length; peritoneum usually silvery ventrally and anteriorly, but heavily pigmented dorsally and at sides.

Coloration.—In alcohol the back is light brownish, pale on belly, sides with a wide silvery band above lateral line, except anteriorly; sometimes this band is grayish posteriorly and in the young darker; base of middle caudal fin rays with a blackish pigment spot, this pigment on the membranes between the supporting bony rays as much as on the rays, the spot disappearing about halfway out to the end of the middle rays; dorsal fin with a few scattered pigment cells, but never arranged to form a bar or band; humeral bar mostly above lateral line and vertically elongate, somewhat oval or wedge-shaped.

The following colors of the fish in life were recorded: Dorsal fin pinkish, back yellowish; adipose fin orange-yellow; dorsal part of eye bright red; upper and lower lobes of caudal fin yellowish; anal fin

pinkish anteriorly; pectorals pale orange-yellow; lateral band plumbeous, ending in a black spot at midbase of caudal fin; humeral bar black; sides silvery.

Remarks.—This new species of *Creagrutus* differs from others referred to this genus in having a black spot at midcaudal fin base, as well as in having the dorsal fin over or a little in front of a vertical through the pelvic insertions. The lobes of the caudal fin are yellowish instead of red as in *Creagrutus beni* of the Maracaibo Basin.

Named *hildebrandi* in honor of Dr. Samuel F. Hildebrand, of the U. S. Fish and Wildlife Service, who has made extensive contributions on the fish fauna of Panama.

CREAGRUTUS PHASMA Myers

Creagrutus phasma Myers, Bull. Mus. Comp. Zool., vol. 68, No. 3, p. 117, 1927 (mouth of Curamuni, Río Cassiquiare, Venezuela).—Eigenmann and Myers, Mem. Mus. Comp. Zool., vol. 43, pt. 5, p. 548, 1929 (Río Cassiquiare, Venezuela).

CREAGRUTUS BOLIVARI, new species

Figure 49

Holotype.—U.S.N.M. No. 121497, a specimen 51.5 mm. in standard length, collected by L. P. Schultz, G. Zuloaga, William Phelps, Jr., Roger Sherman, May 12, 1942, in the Río Guárico and tributaries between San Sebastián and San Casimiro, Estado de Aragua.

Paratypes.—U.S.N.M. No. 121498, 90 specimens, 29 to 48 mm., collected along with the holotype and bearing same data.

This species occurred in the quieter eddies of the rapidly flowing waters.

Description.—This description is based on the holotype and paratypes listed above. Measurements were made of the former and one of the latter, and these data, recorded in hundredths of the standard length, are presented in table 22. Additional counts are recorded in table 23.

Table 23.—*Counts made on species of* Creagrutus *from Venezuela*

Species	Number of fin rays														Number of scales											
	Dorsal	Anal					Pectoral						Pelvic			Rows crossing lateral line				Above lateral line			Below lateral line		In front of dorsal			
	ii, 8	iii, 8	iii, 9	iii, 10	iii, 11	iii, 12	i, 10	i, 11	i, 12	i, 13	i, 14	i, 6	i, 7	i, 8	35	36	37	38	4	5	6	3	4	9	10	11	12
hildebrandi	12	---	---	4	9	4	1	2	7	---	---	1	5	---	4	1	1	--	3	1	1	5	--	3	10	1	--
bolivari	6	2	18	1	---	---	---	1	2	5	1	---	4	---	--	--	2	1	--	2	--	3	--	16	--	--	--
beni	12	---	---	18	51	6	5	8	1	---	---	---	9	1	2	2	9	3	--	15	--	9	6	--	2	31	2

Body a little compressed, depth 3⅓ to 4 and head 3⅔ to 4, in standard length; snout bluntly rounded, projecting in front of lower jaw, so that when the mouth is closed the two most anterior teeth on the premaxillary are fully exposed; mouth when closed on level of lower edge of eye; posterior tip of maxillary under front of eye; second suborbital covering about two-thirds of the cheek, its greatest width equal to ¾ eye and ventrally and posteriorly not in contact with the preopercle; interorbital space convex, nearly equal to eye and about equal to length of snout; eye diameter a little greater than length of snout; dorsal and ventral profiles nearly equal, the greatest depth at origin of dorsal; anterior margin of nasal opening with a short papilla projecting into opening, anterior and posterior nasal openings

FIGURE 49.—*Creagrutus bolivari*, new species: Holotype, U.S.N.M. No. 121497, 51.5 mm. in standard length.

separated by a flap of skin; dorsal origin over or usually a little in front of vertical line through pelvic insertion; a vertical line through adipose origin, passing just behind the base of last anal ray; a vertical line through anal origin passes one-third to one-half way out the depressed last dorsal ray; caudal peduncle nearly an eye diameter longer than anal fin base; gill rakers about 5+9, very short on anterior part of the first gill arch, much longer on lower part of arch; gill membranes free from the isthmus; lateral line complete, a little decurved anteriorly; teeth tricuspid, arranged essentially as shown in figure 48 of *C. hildebrandi*; maxillary usually with 3 teeth; mandible usually with 5 teeth on each side, the 3 anterior ones on each side enlarged, also tricuspid; breast and predorsal area rounded, evenly and normally scaled; pectorals not quite reaching pelvic insertions and pelvics not quite reaching anal origin; distal margins of dorsal and anal fins a little concave, that of the paired fins a little convex; caudal fin forked, the lobes nearly equal in length and scaled out as far as about one-fourth to two-fifths their length; intestine with one main loop; several pyloric caeca.

Coloration.—In alcohol the back is tan or straw-colored and often with a brownish streak along the middorsal line; dorsal fin with scattered dark pigment cells distally and more numerous anteriorly; other fins unpigmented; no caudal spot; humeral bar brownish, crescent-shaped with the concavity on anterior side and the rear margin a little convex dorsally but nearly straight ventrally; this humeral bar resembles a somewhat flattened question mark on many specimens; peritoneum silvery ventrally, but pigmented with black dorsally.

Remarks.—This new species differs from all other species of *Creagrutus* in having fewer (iii, 8 or iii, 9) anal rays, except *Creagrutus brevipinnis*, which has iii, 9 or iii, 10; it differs also in having a crescent-shaped humeral bar instead of an elongate one as in *brevipinnis*; the latter species is deeper and less elongate than *bolivari*. From *C. phasma* it differs as indicated in the key.

Named *bolivari* in honor of the liberator of northern South America.

CREAGRUTUS BENI Eigenmann

Creagrutus beni Eigenmann, Ann. Carnegie Mus., vol. 7, No. 1, p. 172, pl. 6, fig. 2, 1911 (Villa Bella on Río Beni); Indiana Univ. Stud., vol. 7, No. 44, p. 12, 1920 (Río Guaire near Caracas; El Concejo, Río Tiquirito; Maracay, Río Bue; Isla del Buro, Venezuela).—Pearse, Univ. Wisconsin Stud., No. 1, pp. 20, 43, 1920 (Lake Valencia, Isla del Buro, Venezuela).—Eigenmann, Mem. Mus. Comp. Zool., vol. 43, pt. 4, p. 421, pl. 58, fig. 3, pl. 93, figs. 4, 5, 7, 1927 (Lake Valencia Basin, Venezuela).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 83, p. 408, 1931 (Yarapa River at Yarapa, Venezuela).

The following collections were made by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121501, 50 specimens, 24 to 70 mm. in standard length, from the Río Cobre above mouth, tributary to Río Quinta, thence into Río La Grita below La Grita, Catatumbo system, March 31.

U.S.N.M. No. 121505, 356 examples, 14.5 to 74 mm., Río Gonzáles, tributary to Río Chama, at La Gonzáles, Estado de Mérida, March 29.

U.S.N.M. No. 121506, 4 examples, 23 to 31 mm., Río Chama, 10 km. below Lagunillas, Estado de Mérida, March 30.

U.S.N.M. No. 121502, 25 specimens, 19 to 57 mm., Río Motatán, 4 km. above Motatán, March 25.

U.S.N.M. No. 121504, 7 specimens, 19 to 54 mm., Río Táchira, 7 km. north of San Antonio, Catatumbo system, April 1.

U.S.N.M. No. 121503, 28 examples, 23 to 55 mm., Río Chama at Estanques, Estado de Mérida, April 3.

U.S.N.M. No. 121499, 378 specimens, 18 to 71 mm., Río Barregas just below Egido, Río Chama system, Estado de Mérida, March 29.

The following collection was made in the Río Tuy system near Caracas: U. S. N. M. No. 121500, 5 examples, 36 to 49 mm., quebrada near El Valle south of Caracas, May 12, 1942, L. P. Schultz, G. Zuloaga, William Phelps, Jr., R. Sherman.

Two specimens, 50 and 59 mm., from Caripito, Venezuela, 1942, collected by Dr. William Beebe, were lent to me for study and report. They are referred to this species with some uncertainty.

Undoubtedly, when sufficient specimens of this form from the Upper Orinoco system and from the Maracaibo Basin are available for critical comparison, the two populations will be shown to be subspecifically different. However, at the present time it seems advisable to refer all the various populations to the species *beni*, which it closely resembles. See table 23 for counts.

The following color notes were recorded for a specimen from the Río Chama at Estanques: Pelvic, pectoral, and adipose fins yellowish orange; front of anal fin orange; dorsal surface of eye red; area in front of eye yellow; central area of upper and lower caudal lobes bright red; back yellowish orange; lateral band and lower sides silvery, the lateral band is dark grayish or plumbeous in color on caudal peduncle; no caudal spot. The following color notes were recorded for a specimen from the Río Motatán, 4 km. above Motatán: Dorsal surface of eye orange; back yellowish; pelvics yellowish orange as is front of anal fin; central area of caudal lobes bright red, with yellowish color basally; lateral band grayish; dorsal and anal fins slight grayish distally; no caudal spot.

Genus CREAGRUDITE Myers

Creagrudite Myers, Bull. Mus. Comp. Zool., vol. 68, No. 3, p. 118, 1927. (Type, *Creagrudite maxillaris* Myers.)

CREAGRUDITE MAXILLARIS Myers

Creagrudite maxillaris Myers, Bull. Mus. Comp. Zool., vol. 68, No. 3, p. 118, 1927 (sandbank on Colombian border, Rio Negro, Cucuhy, Brazil; mouth of Curamuni, Río Cassiquiare, Venezuela).—Eigenmann and Myers, Mem. Mus. Comp. Zool., vol. 43, pt. 5, p. 547, 1929 (Cucuhy; mouth of Curamuni, Río Cassiquiare).

Genus TETRAGONOPTERUS Cuvier

Tetragonopterus Cuvier, Règne animal, vol. 2, p. 166, 1817. (Type, *Tetragonopterus argenteus* Cuvier.) (Ref. copied.)

KEY TO THE SPECIES OF TETRAGONOPTERUS FROM VENEZUELA AS REPORTED IN THE LITERATURE (AFTER EIGENMANN)

1*a*. Anal rays 36 or 37; occipital process bordered by 5 to 7 scales on each side; caudal lobes scaled for about half their length; distance of dorsal from tip of snout greater than distance of pelvics from tip of snout; pelvics equidistant from snout tip and last third or fourth of anal; 12 to 16 azygous predorsal scales; scales 7 to 9–32 to 35–3½ to 5.

Tetragonopterus argenteus Cuvier

1*b*. Anal rays 32 or 33; occipital process bordered by 3 or 4 scales on each side; caudal lobes densely scaled to near tip; dorsal and pelvics about equidistant from tip of snout; pelvics equidistant from tip of snout and end of anal; 8 or 9 azygous predorsal scales; scales 7–29 to 34–3½.

Tetragonopterus chalceus Agassiz

TETRAGONOPTERUS ARGENTEUS Cuvier

Tetragonopterus argenteus Cuvier, Mem. Mus. Hist. Nat., vol. 4, p. 455, 1818.—Steindachner, Denkschr. Akad. Wiss. Wien, vol. 41, p. 155, 1879 (Ciudad Bolívar).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 52, 1891 (Orinoco).—Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 157, 1899 (Apure River, Venezuela).—Eigenmann, Mem. Mus. Comp. Zool., vol. 43, pt. 1, p. 55, 1917 (Orinoco to Buenos Aires).—Eigenmann and Allen, Fishes of western South America, p. 237, 1942 (Orinoco Basin to the La Plata).

TETRAGONOPTERUS CHALCEUS Agassiz

Tetragonopterus chalceus Agassiz, *in* Spix, Selecta genera et species piscium . . . Brasiliam . . ., p. 70, pl. 33, fig. 1, 1829 (ref. copied).—Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 157, 1899 (Apure River, Venezuela).

Genus MOENKHAUSIA Eigenmann

Moenkhausia Eigenmann, Smithsonian Misc. Coll., vol. 45, p. 145, 1903. (Type, *Tetragonopterus xinguensis* Steindachner.)

KEY TO THE SPECIES OF MOENKHAUSIA AS REPORTED FROM VENEZUELA IN THE LITERATURE

1*a*. Anal rays iii, 29 to iii, 33; scales 8 or 9+30 to 32+8 or 9 (? 10); predorsal scales 14 or 15; depth 2, head 3¼ to 3½; no caudal spot; fins not elongate; grayish humeral spot present ..... **Moenkhausia bondi** (Fowler)

1*b*. Anal rays iii, 24 to iii, 27; scales about 7+35+6; depth 2⅓ to 2½, head 4; fins all elongate, depressed dorsal reaching past adipose; no caudal or humeral spots; a narrow lateral band ..... **Moenkhausia pittieri** Eigenmann

1*c*. Anal rays iii, 23 to iii, 24; scales 7+35 or 36+6; depth 2⅔ to 2½, head 3¼ to 3⅔; a blackish round caudal spot; no distinct humeral spot or dark lateral streak ..... **Moenkhausia miangi** Steindachner

None of the three species listed here for the genus *Moenkhausia* has been examined by me.

MOENKHAUSIA BONDI (Fowler)

Phenacogaster bondi Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 63, p. 419, 1911 (Corisal, Orinoco Delta, Venezuela).

Moenkhausia bondi Eigenmann, Mem. Mus. Comp. Zool., vol. 43, pt. 1, p. 69, pl. 14 fig. 3, pl. 100 fig. 7, 1917 (Venezuela).

MOENKHAUSIA PITTIERI Eigenmann

Moenkhausia pittieri Eigenmann, Indiana Univ. Stud., No. 44, p. 10, pl. 3, 1920 (Concejo, Río Tiquirito; Maracay, Río Bue, all in Valencia Basin, Venezuela).—Eigenmann and Myers, Mem. Mus. Comp. Zool., vol. 43, pt. 5, p. 520, 1929 (Concejo, Río Tiquirito; Maracay, Río Bue, Venezuela).

MOENKHAUSIA MIANGI Steindachner

Moenkhausia miangi Steindachner, Denkschr. Akad. Wiss. Wien, vol. 93, p. 43, pl. 3, fig. 5, 1917 (Río Miang, border of Venezuela).—Eigenmann and Myers, Mem. Mus. Comp. Zool., vol. 43, pt. 5, p. 525, 1929 (Río Miang).

Genus BRYCONAMERICUS Eigenmann

Bryconamericus Eigenmann, Ann. Carnegie Mus., vol. 4, p. 139, 1907. (Type, *Bryconamericus exodon* Eigenmann.)

Knodus Eigenmann, Ann. Mag. Nat. Hist., ser. 8, vol. 7, p. 216, 1911. (Type, *Knodus meridae* Eigenmann.)

Knodus Eigenmann, Mem. Mus. Comp. Zool., vol. 43, pt. 1, p. 50, 1917; pt. 2, p. 114, 1918 (type, *Knodus breviceps* Eigenmann).—Eigenmann and Myers, Mem. Mus. Comp. Zool., vol. 43, pt. 5, p. 526, 1929 (genotype corrected to *Knodus meridae* Eigenmann).

The genus *Knodus* Eigenmann was created on a single specimen taken near Mérida, Venezuela. It was not diagnosed until some years later (Eigenmann, Mem. Mus. Comp. Zool., vol. 43, pt. 1, p. 50, 1917, and pt. 2, p. 114, 1918), when Eigenmann injected considerable confusion by basing his generic diagnosis on *Knodus breviceps* Eigenmann instead of on the only permissible genotype, *Knodus meridae*.

The chief difference between *Knodus* and *Bryconamericus* is supposed to be that in the former the basal half of each caudal fin lobe is covered with scales while in *Bryconamericus* the base of each caudal lobe is naked. I have examined several species and find that in certain ones the scales are lacking (as in *B. emperador* from Panama) while in others the scales extend out a short distance (as in *B. peruanus*). Now in *Knodus meridae* the scales extend about one-third to one-half the way out on the caudal lobes but not so far out as in *B. beta*. The amount of gradation is so variable that I cast serious doubt on the supposed difference between *Knodus* and *Bryconamericus*. I conclude that *Knodus* should be referred as a synonym to the genus *Bryconamericus*, at least until someone has adequate material that will permit further studies on this problem.

It should be pointed out that the scales on the base of the caudal fin lobes of cotypes of *Bryconamericus breviceps* Eigenmann, U.S.N.M. No. 120274, are large as in *K. meridae*, and not small as shown for *breviceps* on plate 10, figure 2, of Eigenmann's (1918) "The American Characidae."

The species of *Bryconamericus* collected by me in the Maracaibo Basin fall into two general forms; one is elongate and more or less oval in cross-section and the other species is a compressed form. Both of these appear to be related to species occurring in the Orinoco drainage. Doubt is here cast on the specific distinctness between *B. cismontanus* and *B. deuterodonoides*. Unfortunately the maxillary teeth of the former are not described in sufficient detail, while the maxillary teeth of the latter are said to be broad, and this describes fairly well those of the material that I collected, and I have identified my specimens as a subspecies of the form named *B. deuterodonoides*. A careful study may show that *B. cismontanus* is another form or that these two species are synonymous.

The following tentative key will aid in identifying the species of *Bryconamericus* from Venezuela:

1*a*. Depth 2.5 to 3, usually about 2.6 to 2.8 in standard length; scales above lateral line 5 or 6, usually 6; anal rays iii, 20 to iii, 30; maxillary teeth with

middle denticle longest and strongest, distal surface forming a more or less obtuse angle; outer row of premaxillary teeth usually not all in line; a black line along midaxis of body beginning behind pale area behind vertical humeral spot, thence continuing to elongate blackish caudal spot that extends on middle caudal fin rays, but color diffuse and fading distally on them; dorsal rays always ii, 8; origin of dorsal fin an equal distance between tip of snout and midcaudal fin base or a trifle closer to latter.

2*a*. Anal rays iii, 23 to iii, 30, usually iii, 25 to iii, 28; usually 2 or 3 teeth on the maxillary; scales 5 or 6—36 to 39—3 or 4.

Bryconamericus beta beta Eigenmann

2*b*. Anal rays iii, 20 to iii, 23, rarely iii, 23; usually 3 or 4 teeth on maxillary; scales 6–35 to 37–4 or 5; 4 scales between lateral line and anal origin; pelvic rays i, 7; pectorals i, 9 to i, 11, usually i, 10; gill rakers 4 to 6+8 to 10; outer row of premaxillary usually with 5 teeth.

Bryconamericus beta motatanensis, new subspecies

1*b*. Depth 3.0 to 3.6, usually 3.2 to 3.5 in standard length; scales above lateral line 4 or 5, usually 5, and below it 3, rarely 4; anal rays iii, 13 to iii, 18; middle denticle on maxillary teeth little or no stronger than other denticles, distal edge of these maxillary teeth truncate or a little convex; maxillary teeth as broad as high; a wide dark lateral band, more intense posteriorly, ending in a black caudal spot that does not continue to end of middle caudal fin rays; a dark humeral spot, vertically elongate; peritoneum black; 5 or 6 pyloric caeca.

3*a*. Pelvic rays i, 7, occasionally i, 6; anal iii, 15 to iii, 17; pectoral usually i, 10 or i, 11.

4*a*. Two teeth in outer row of premaxillary, rarely 3; maxillary with 3 teeth, rarely 4; scales above lateral line usually 4, occasionally 5.

Bryconamericus deuterodonoides deuterodonoides Eigenmann[29]

4*b*. Four teeth, rarely 3 or 5, in outer row of premaxillary; maxillary with 2 or 3 teeth; scales above lateral line 5 and 3 scales between lateral line and anal origin.

Bryconamericus deuterodonoides euryodous, new subspecies

3*b*. Pelvic rays i, 6, rarely i, 5; anal iii, 13 to iii, 16; pectoral usually i, 9 or i, 10; 4 teeth, rarely 3 or 5, in outer row of premaxillary; maxillary with 3 to 5 teeth; scales above lateral line usually 5, and 2 to 2½ scales from lateral line to anal origin.....**Bryconamericus meridae** (Eigenmann)

BRYCONAMERICUS BETA BETA Eigenmann

Bryconamericus beta Eigenmann, *in* Eigenmann, Henn, and Wilson, Indiana Univ. Stud., No. 19, p. 7, 1914 (Villavicencio, Colombia); Indiana Univ. Stud., vol. 7, No. 44, p. 11, 1920 (Concejo, Río Tiquirito, Venezuela); Mem. Carnegie Mus., vol. 9, No. 1, p. 236, 1922 (northern Venezuela); Mem. Mus. Comp. Zool., vol. 43, No. 4, p. 389, pl. 91, fig. 2, 1927 (Concejo, Río Tiquirito, Venezuela).

? *Bryconamericus* sp. ? Eigenmann, Indiana Univ. Stud., vol. 7, No. 44, p. 11, 1920 (Isla del Buro, Lake Valencia, Venezuela).

U.S.N.M. No. 121468, 3 specimens, 21 to 25 mm., Río Guárico and tributaries between San Sebastián and San Casimiro, collected by L. P. Schultz, G. Zuloaga, R. Sherman, and William Phelps, Jr., May 12, 1942.

[29] Not reported from Venezuela but from Villavicencio, Colombia.

Thirteen specimens, 23 to 45 mm., from Caripito, Venezuela, William Beebe, 1942, were lent to me for study and report.

BRYCONAMERICUS BETA MOTATANENSIS, new subspecies

FIGURE 50

Holotype.—U.S.N.M. No. 121477, a specimen 39.5 mm. in standard length, collected by Leonard P. Schultz, March 20, 1942, in the Río San Juan at bridge south of Mene Grande, Motatán system.

Paratypes.—All paratypes were collected by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121478, 77 specimens, 22 to 47 mm., taken along with the holotype and bearing same data.

U.S.N.M. No. 121479, 10 examples, 22.5 to 36 mm., Río Motatán, 4 km. above Motatán, March 25.

U.S.N.M. No. 121481, 45 examples, 22 to 44 mm., Río San Pedro at bridge south of Mene Grande, Motatán system, March 17 to 20.

U.S.N.M. No. 121480, 1 specimen, 34.5 mm., from Río Jimelles, 12 km. east of Motatán, Motatán system, March 24.

FIGURE 50.—*Bryconamericus beta motatanensis*, new subspecies: Holotype, U.S.N.M. No. 121477, 39.5 mm. in standard length.

This species occurred in the quieter eddies of these rivers.

Description.—Based on the holotype and paratypes listed above. Detailed measurements were made on the holotype and one paratype, and these data, recorded in hundredths of the standard length, are given first for the holotype, then the paratype in parentheses. Standard lengths in mm. 39.5 (46).

Length of head 29.1 (28.3); greatest depth 36.7 (36.1); length of snout 7.09 (6.74); diameter of eye 10.6 (9.78); length of maxillaries 10.6 (10.9); width of interorbital 9.37 (9.35); postorbital length of head 12.9 (13.5); least depth of caudal peduncle 13.2 (12.8); length of caudal peduncle or distance from base of last anal ray to midcaudal

fin base 15.2 (14.1); least preorbital width 1.52 (1.74); length of anal fin base 31.7 (33.7); longest ray of anal fin 17.7 (17.8); longest ray of dorsal 21.5 (22.8); longest ray of pectoral 22.0 (25.0); longest ray of pelvics 16.5 (17.4); longest ray of upper lobe of caudal fin 29.9 (33.3); longest ray of lower lobe of caudal fin 29.9 (33.2); distance from snout to dorsal origin 53.2 (55.2); snout to anal origin 62.2 (62.8); snout to adipose 84.8 (87.0); snout to pectoral insertion 25.8 (27.4); snout to pelvic insertion 45.6 (47.4); snout to anus 55.7 (56.5); distance from dorsal origin to midcaudal fin base 50.4 (50.0).

The following counts were made, respectively: Dorsal rays ii, 8 (ii, 8); anal iii, 22 (iii, 21); pectoral i, 10–i, 10 (i, 11–i, 11); pelvic i, 7–i, 7 (i, 7–i, 7); branched caudal rays 17 (17); number of gill rakers on first gill arch – – (6+10); scales from upper edge of gill opening to midcaudal fin base 37 (37); scales above lateral line 6 (6) and below it to pelvic insertion 4 (4); scales in front of dorsal 12 (14) and along one side of the supraoccipital process 2 (2); number of teeth in outer row of premaxillary 5–5 (5–4) and in the inner row 4–4 (4–4); teeth on maxillary 2–2 (4–4). See table 24 for additional counts.

Body compressed, its depth 2.7 to 2.9, head 3.5 to 3.8 in standard length; snout 1⅓ in eye and about 4 in head; interorbital about equal to eye and 3 in head; dorsal and ventral profiles about equally arched; predorsal and preventral areas rounded, normally scaled; supraoccipital process short, its length contained 5½ to 6½ times in distance from tip to dorsal origin; snout blunt, the lower jaw a little included so that when mouth is closed the outer row of teeth on the premaxillary show; mouth when closed a little above lower edge of pupil; rear tip of maxillary not quite extending to a vertical through front edge of pupil; ventral margin of second suborbital meeting preopercle; lateral line complete, decurved anteriorly; gill rakers short, pointed, sometimes a few of those on the lower part of the arch branched; teeth all 3- to 5-pointed, the middle denticle longest and strongest; anal origin usually under the second or third, from the last dorsal ray; adipose origin about over the fifth from last anal ray; dorsal origin a little closer to midcaudal fin base than tip of snout; pelvic insertion a trifle closer to base of last anal ray than to tip of snout; the first branched rays of all fins longest; caudal fin forked; the distal margin of anal fin truncate or a trifle concave, and that of dorsal a little rounded; the pectorals reaching a little past pelvic insertions and the pelvic fins reach almost to the anal origin; intestine with one main loop; about 7 or 8 pyloric caeca; scales on basal part of caudal fin extend out a little over one-third the length of that fin; no pouch on caudal fin.

Coloration.—In alcohol there is a black line along midaxis of body from behind the vertically elongate humeral spot to midcaudal fin base, where it ends in a blackish caudal spot, the latter diffusing on middle caudal fin rays and usually not quite reaching the distal margin of the

TABLE 24.—*Counts recorded for species of* Bryconamericus

Species	Number of fin rays																												
	Dorsal	Anal																				Pectoral				Pelvic		
	ii, 8	iii, 13	iii, 14	iii, 15	iii, 16	iii, 17	iii, 18	iii, 19	iii, 20	iii, 21	iii, 22	iii, 23	iii, 24	iii, 25	iii, 26	iii, 27	iii, 28	iii, 29	iii, 30	i, 9	i, 10	i, 11	i, 12	i, 5	i, 6	i, 7
deuterodonoides euryodous	11	----	----	1	8	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	11	14	2	----	6	18
deuterodonoides deuterodonoides	x	----	----	x	x	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
meridae	14	2	9	8	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	4	11	1	2	1	23	----
cismontanus	x	----	x	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
beta beta	x	----	----	----	----	----	----	----	----	----	----	1	2	7	15	9	6	1	1	----	----	----	----	----	----	----
beta motatanensis	18	----	----	----	----	----	----	----	3	6	6	1	----	----	----	----	----	----	----	3	15	4	----	----	----	16

Species	Number of scales															Number of gill rakers on first gill arch								Number of teeth on one side of upper jaw									
	Rows crossing lateral line					Above lateral line				Below lateral line			In front of dorsal fin				Above angle				Below angle				Premaxillary						Maxillary			
																									Outer row					Inner row				
	35	36	37	38	39	4	5	6	7	3	4	5	11	12	13	14	4	5	6	7	7	8	9	10	2	3	4	5	6	4	2	3	4	5
deuterodonoides euryodous	1	8	4	----	----	----	12	----	----	12	----	----	3	6	2	----	3	4	----	----	----	----	2	5	----	2	15	2	----	18	14	10	----	----
deuterodonoides deuterodonoides	x	x	x	x	----	x	x	----	----	x	----	----	----	x	----	----	x	----	----	----	x	----	----	----	x	x	----	----	----	x	----	x	x	----
meridae	2	4	1	----	----	1	6	----	----	7	----	----	----	4	3	----	----	5	1	----	----	----	3	3	----	2	18	3	----	22	----	12	9	2
cismontanus	----	----	x	----	----	----	x	----	----	----	x	----	----	----	----	----	----	----	----	x	----	----	----	x	----	----	----	x	x	x	x	----	----	----
beta beta	----	2	5	7	2	----	x	x	----	x	x	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	6	2	1	----
beta motatanensis	1	6	6	----	----	----	----	10	----	----	9	1	----	1	5	5	1	4	2	----	----	2	2	3	----	----	7	21	2	30	8	19	4	----

caudal fin; at base of each caudal fin lobe, above and below the blackish caudal spot, is a pale area, then rest of fin is dusky; sometimes the black line along midaxis of body lies in a blackish lateral streak posteriorly; middorsal edge of back more intensely pigmented than adjacent sides, forming a more or less dark brownish dorsal streak; upper lip blackish, the teeth of outer row of premaxillary showing as pale spots in the dark pigmented area; distal margin of anal fin with a little intensification of the dark pigment.

Remarks.—This new subspecies differs from *B. beta beta* chiefly in the decreased number of anal rays and in the increased number of teeth on the maxillary. These differences, among other average differences, are recorded in table 24. The largest females had nearly mature eggs in the body cavity. These eggs were large in diameter for such a small fish, though not very numerous.

Named *motatanensis* after the stream system in which it was captured.

BRYCONAMERICUS DEUTERODONOIDES EURYODOUS, new subspecies

FIGURE 51

Holotype.—U.S.N.M. No.121437, an example 33.2 mm. in standard length, collected by L. P. Schultz, G. Zuloaga, Roger Sherman, and William Phelps, Jr., May 12, 1942, in the Río Guárico and tributaries between San Sebastián and San Casimiro, Estado de Aragua, Venezuela.

Paratypes.—U.S.N.M. No. 121438, 408 specimens, 18 to 37 mm., taken along with the holotype and bearing same data.

Description.—Based on the holotype and paratypes; detailed measurements were made on the former and one of the latter. These data, recorded in hundredths of the standard length, are given first for the holotype, then the paratype in parentheses, respectively. Standard length in mm. 33.2 (36.2).

Length of head 27.1 (28.5); greatest depth 31.0 (29.5); length of snout 6.93 (6.90); diameter of eye 10.5 (9.67); length of maxillaries or distance from tip of snout to posterior tip of the maxillary 10.8 (11.1); width of interorbital 9.04 (8.84); postorbital length of head 13.9 (13.8); least depth of caudal peduncle 12.0 (11.9); length of caudal peduncle 16.6 (18.0); least width of preorbital 1.54 (1.41); length of base of anal 24.7 (24.8); longest ray of anal fin 16.9 (16.6); longest ray of dorsal fin 22.6 (21.3); longest ray of pectoral fin 22.3 (21.3); longest pelvic fin ray 15.1 (14.6); length of upper caudal lobe 28.6 (27.6); length of lower caudal lobe 28.6 (26.8); distance from snout tip to dorsal origin 52.7 (51.0); snout to anal origin 61.5 (63.2); snout to adipose origin 85.6 (85.0); snout to pectoral insertion 24.7 (25.7); snout to pelvic insertion 48.5 (48.8); snout to anus 60.2 (58.0); distance from dorsal origin to midcaudal fin base 53.0 (53.4).

The following counts were made, respectively: Dorsal rays ii, 8 (ii , 8); anal iii, 16 (iii, 16); pectoral i, 11–i, 11 (i, 11–i, 11); pelvic i, 7–i, 7 (i, 7–i, 7); branched caudal fin rays 17 (17); gill rakers on first gill arch – – (5+9); number of scales from upper edge of gill opening to midcaudal fin base 36 (36); scales above lateral line 5 (5); below lateral line to pelvic insertion 3 (3); predorsal scales to tip of supraoccipital process 11 (12), and 2 (2) scales along side of that process; number of teeth in outer row of premaxillary 4–4 (3–4) and inner row 4–4 (4–4); teeth on maxillary 2–3 (2–2). Additional counts are recorded in table 24.

Body only a little compressed, the greatest depth usually 3.1 to 3.3, head 3.5 to 3.7, in standard length; snout 1⅓ in eye and about 4.0 to

FIGURE 51.—*Bryconamericus deuterodonoides euryodous*, new subspecies: Holotype, U.S.N.M. No. 121437, 33.2 mm. in standard length. (The last dorsal ray has two separate bases and not a single one as shown in the drawing.)

4.2 in head; interorbital about equal to eye and 3.0 to 3.2 in head; dorsal and ventral profiles about equally arched; predorsal and preventral areas rounded and normally scaled; supraoccipital process short, its length about 8 times in distance from tip of this process to dorsal origin; snout blunt, rounded, the lower jaw slightly included, the outer row of premaxillary teeth scarcely showing; mouth when closed on a level a little above lower edge of pupil; rear tip of the maxillary extending to a vertical through front edge of pupil; ventral edge of second suborbital in contact with preopercle below; lateral line complete, a little decurved anteriorly; gill rakers short-pointed; teeth all 3- to 5-pointed, with middle denticle longest and strongest, except those on the maxillary, the teeth on the latter usually have about 6 denticles of nearly equal size; anal origin under rear edge of dorsal fin base; adipose origin over base of last anal ray; dorsal origin almost an equal distance between tip of snout and midcaudal fin base; pelvic insertion much closer to base of last anal ray than snout

tip, or an equal distance between last anal ray and pupil; caudal fin forked; the first branched ray of all fins longest; distal margin of anal fin a little concave, that of dorsal, pelvics and pectorals a little convex; pectorals not quite reaching to pelvic insertion and pelvics not quite to anal origin; intestine with one main loop and about 6 pyloric caeca; basal part of caudal fin scaled, the scales extending out on the lobes a little over one-third the distance to tips of each lobe; no pouch on caudal fin.

Coloration.—In alcohol the lateral band is blackish, more intense posteriorly but not ending in a distinct caudal spot; the black pigment continues a short distance out on the middle caudal fin rays but fades out before reaching their tips; the dark humeral spot is vertically elongate, with pale areas before and behind it; peritoneum black. On some specimens a more or less obscure pale streak occurs above the blackish lateral band; midline of back with a dark streak.

Remarks.—This new subspecies differs from the other subspecies of *deuterodonoides* as indicated in the key.

The largest females have in their body cavities large eggs, nearly mature. These eggs are not numerous, only a few dozen in each specimen.

Named *euryodous* in reference to the broad teeth on the maxillary.

BRYCONAMERICUS MERIDAE (Eigenmann)

FIGURE 52

Knodus meridae EIGENMANN, Ann. Mag. Nat. Hist., ser. 8, vol. 7, p. 216, 1911 (Mérida, Venezuela); Mem. Mus. Comp. Zool., vol. 43, pt. 2, p. 116, 1918 (Mérida, Venezuela).—EIGENMANN and MYERS, Mem. Mus. Comp. Zool., vol. 43, pt. 5, p. 526, 1929.

The following specimens were collected by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121469, 206 specimens, 15 to 43 mm., in standard length, collected in the Río Motatán, 4 km. above Motatán, March 25.

U.S.N.M. No. 121474, 66 examples, 14.5 to 34.5 mm., from the Río Motatán, 8 km. below Motatán, March 24.

U.S.N.M. No. 121471, 20 examples, 31.5 to 42.5 mm., Río San Pedro at bridge, south of Mene Grande, Motatán system, March 20.

U.S.N.M. No. 121470, 22 specimens, 15 to 41 mm., Río Motatán at bridge, 22 km. north of Motatán, March 17.

U.S.N.M. No. 121476, 2 specimens, 27 and 36 mm., Río Táchira, 7 km. north of San Antonio, Catatumbo system, April 1.

U.S.N.M. No. 121475, 73 examples, 21 to 37 mm., Río Jimelles, 12 km. east of Motatán, tributary Río Motatán, March 24.

U.S.N.M. No. 121473, 51 examples, 17 to 37.5 mm., Río San Juan near bridge, south of Mene Grande, Motatán system, March 17–20.

U.S.N.M. No. 121472, 3 specimens, 26.5 to 37 mm., from Río Gonzáles, tributary to Río Chama, at La Gonzáles, Estado de Mérida, March 29.

The following description is given to supplement that made by Eigenmann in 1911. Detailed measurements were made on two specimens, and these data, recorded in hundredths of the standard length, are given below, respectively. Standard length in mm. 37.3 (42.0).

Length of head 25.5 (28.6); greatest depth of body 31.1 (31.4); length of snout 5.90 (7.62); diameter of eye 8.58 (8.33); length from tip of snout to rear edge of the maxillary 9.65 (11.0); width of interorbital space 8.31 (9.28); postorbital length of head 12.6 (14.8); least depth of caudal peduncle 12.9 (12.1); length of caudal peduncle 18.0 (18.8); least preorbital width 1.34 (1.43); length of anal fin base 23.1 (22.1); length of longest ray of anal fin 14.7 (14.3); longest dorsal ray

FIGURE 52.—*Bryconamericus meridae* (Eigenmann): U.S.N.M. No. 121469, 38 mm. in standard length.

20.1 (18.3); longest pectoral ray 19.6 (20.2); longest pelvic ray 13.9 (13.8); length of upper caudal fin lobe 22.8 (24.5); of lower caudal fin lobe 24.1 (23.8); distance from snout to dorsal fin origin 55.0 (55.0); snout to anal origin 63.8 (65.4); snout to adipose origin 86.0 (87.4); snout to pectoral insertion 24.1 (25.2); snout to pelvic insertion 47.2 (48.4); snout to anus 57.8 (60.2); distance from dorsal origin to midcaudal fin base 51.0 (51.6).

The following counts were made, respectively: Dorsal rays ii, 8 (ii, 8); anal iii, 13 (iii, 15); pectoral i, 10–i, 10 (i, 9–i, 9); pelvic i, 6–i, 6 (i, 6–i, 6); branched caudal fin rays 17 (17); number of scales from upper edge of gill opening to midcaudal fin base 35 (34); scales above lateral line 5 (5) and below it to pelvic insertion 3 (3); scales in front of dorsal 12 (12) and 1½ (1½) alongside of supraoccipital process; teeth in outer premaxillary row 4–4 (4–4) and in the inner row 4–4 (4-4); teeth on maxillary 3–3 (4–5).

Body a little compressed, greatest depth usually 3.2 to 3.4, head about 3.6 to 3.8 in standard length; snout 1⅓ in eye and about 4.1 or

4.2 in head; interorbital convex, equal to eye, and 3.0 to 3.2 in head; dorsal and ventral profiles equal; predorsal and preventral areas rounded, normally scaled; supraoccipital process short, about 8 times from its tip to dorsal origin; snout bluntly rounded; lower jaw a little shorter than upper, outer row of premaxillary teeth usually evident; mouth when closed a trifle above lower level of pupil; rear tip of maxillary reaches to a vertical through front edge of pupil; ventral edge of second suborbital in contact with preopercle below; lateral line complete, anteriorly decurved; gill rakers short, pointed; teeth all 3- to 5-pointed with the middle denticle longest and strongest, except in the maxillary teeth, which have their denticles more or less of equal size; maxillary teeth as broad as high; anal origin under fourth or fifth from last dorsal fin ray; adipose origin a little behind a vertical through posterior end of anal fin base; dorsal origin about equidistant between snout tip and midcaudal fin base; pelvic insertion much closer to base of last anal ray than snout tip, equidistant between base of last anal ray and pupil; caudal fin forked; first rays of all fins longest; distal margin of anal fin truncate or a little concave, that of other fins a little convex; pectorals not reaching pelvic insertions and pelvic fins not reaching anal origin; intestine with one main loop and about 6 pyloric caeca; basal part of caudal fin scaled, the scales extending out as far as one-half the length of the lower caudal fin lobe; no pouch on caudal fin.

Coloration.—In alcohol the blackish lateral band is wide, more intense posteriorly, ending in a more or less blackish caudal spot, but the black spot at base of middle caudal fin rays does not extend to the tips of the middle rays, ending gradually about halfway out; the dark humeral spot is vertically elongate, bordered in front and behind by a distinct pale area; peritoneum black; midline of back with a dark streak.

Genus HEMIGRAMMUS Gill

Hemigrammus Gill, Ann. Lyc. Nat. Hist. New York, vol. 6, p. 420, 1858. (Type, *Poecilurichthys unilineatus* Gill.)

Since I have at hand but one species of this genus from Venezuela, I can do no better than copy the information from the various works by Eigenmann for the three species reported from Venezuela.

KEY TO THE SPECIES OF HEMIGRAMMUS AS REPORTED IN THE LITERATURE FROM VENEZUELA (AFTER EIGENMANN, 1918)

1*a*. Dorsal fin with a well-defined black spot; anal with an intense black bar from a little in front of the base of the first ray to the tips of fourth and fifth rays; humeral spot vertically elongate, often faint and sometimes lacking; second suborbital leaving a narrow naked area below; six small, tricuspid and conical teeth on the maxillary; dorsal rays 11; anal 23 to 27; scales 5—32 to 34—3 to 4½----------**Hemigrammus unilineatus** (Gill)

1*b*. Dorsal fin without well-defined black markings; no humeral spot.

2*a*. No caudal spot; caudal lobes crossed by a broad black marginal or submarginal band; maxillary with 2 to 4, five pointed teeth, posterior one sometimes conical; dorsal rays 11; anal 20 to 24; scales 5—29 to 34—4. **Hemigrammus marginatus** Ellis

2*b*. Caudal spot present, an unpigmented area between it and lateral stripe; maxillary with one 7-pointed tooth; dorsal rays 11; anal 24; scales 4—32—4 ..... **Hemigrammus micropterus** Meek

HEMIGRAMMUS UNILINEATUS (Gill)

Poecilurichthys unilineatus Gill, Ann. Lyc. Nat. Hist. New York, vol. 6, p. 60, 1858 (Trinidad).

Hemigrammus unilineatus Eigenmann, Mem. Mus. Comp. Zool., vol. 43, pt. 2, p. 141, 1918 (Los Castillas, Venezuela).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 83, p. 407, 1931 (Caño Guanoco, Venezuela).

The following collections, made by Dr. William Beebe, were lent to me for study and report.

One specimen, 25 mm., East Caripito Creek, Caripito, Venezuela, June 3, 1942.

Twelve specimens, 13 to 20 mm., Caripito, Venezuela, 1942.

One specimen, 39 mm., Caripito, Venezuela, 1942.

HEMIGRAMMUS MARGINATUS Ellis

Hemigrammus marginatus Ellis, Ann. Carnegie Mus., vol. 8, No. 1, p. 159, pl. 3, fig. 3, 1911.—? Eigenmann, Indiana Univ. Stud., vol. 7, No. 44, pp. 10–11, 1920 (Maracay, Río Bue, Isla del Buro, Venezuela).—? Pearse, Univ. Wisconsin Stud., No. 1, p. 12, 1920 (Lake Valencia, Venezuela).—Eigenmann and Myers, Mem. Mus. Comp. Zool., vol. 43, No. 5, p. 529, 1929 (questions Eigenmann's identification of Lake Valencia specimens).

HEMIGRAMMUS MICROPTERUS Meek

Hemigrammus micropterus Meek, *in* Eigenmann and Ogle, Proc. U. S. Nat. Mus., vol. 33, pp. 13, 15, 1907 (Los Castillas, Venezuela, Orinoco system).—Eigenmann, Mem. Mus. Comp. Zool., vol. 43, pt. 2, p. 150, pl. 18, fig. 3, pl. 78, fig. 6, 1918 (Los Castillas, Venezuela).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 83, p. 408, 1931 (Pitch Lake at Guanoco, Venezuela).

Genus HYPHESSOBRYCON Durbin

Hyphessobrycon Durbin, Bull. Mus. Comp. Zool., vol. 52, p. 100, 1908. (Type, *Hemigrammus compressus* Meek.)

KEY TO THE SPECIES OF HYPHESSOBRYCON REPORTED FROM VENEZUELA

1*a*. Maxillary with 4 to 7 conical or tricuspid teeth; usually 2 teeth in outer row of premaxillary; a small black spot at base of each caudal lobe; no black lateral stripe and no humeral spot; anal rays 19 [probably iii, 17]; scales 32 to 34 ..... **Hyphessobrycon riddlei** (Meek)

1*b*. Maxillary usually with one tooth; 3 or 4 teeth in outer row of premaxillary; a very distinct continuous black lateral streak from behind head to tips of middle caudal fin rays; anal rays iii, 15 to iii, 21; scales 30 or 31. **Hyphessobrycon sovichthys**, new species

HYPHESSOBRYCON RIDDLEI (Meek)

Hemigrammus riddlei MEEK, *in* Eigenmann and Ogle, Proc. U. S. Nat. Mus., vol. 33, p. 13, 1907 (Los Castillas, Orinoco system, Venezuela).

Hyphessobrycon riddlei EIGENMANN, Mem. Mus. Comp. Zool., vol. 43, pt. 2, p. 189, pl. 26, fig. 3, pl. 79, fig. 6, 14a, 1918 (Los Castillas).

HYPHESSOBRYCON SOVICHTHYS, new species

FIGURE 53

Holotype.—U. S. N. M. No. 121534, a specimen 27 mm. in standard length, collected by Leonard P. Schultz, March 11, 1942, in Ciénaga del Guanavana, about 10 km. north of Sinamaica, Maracaibo Basin, Venezuela.

Paratypes.—All the following paratypes were collected by Leonard P. Schultz (unless otherwise indicated) during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121539, 7 specimens, 18 to 28 mm., taken along with the holotype and bearing same data.

U.S.N.M. No. 121540, 28 specimens, 26 to 29 mm., from Río Apón about 35 km. south of Rosario, February 26.

U.S.N.M. No. 121536, 14 examples, 22 to 31 mm., from Río Negro below mouth of Río Yasa, March 2.

U.S.N.M. No. 121537, an example, 22.5 mm., from the Río Agua Caliente, 2 to 3 km. above Lago Maracaibo, May 1.

U.S.N.M. No. 121535, an example, 27.5 mm., from the Río Palmar near Totuma, about 100 km. southwest of Maracaibo, February 21.

U.S.N.M. No. 121542, 7 specimens, 17 to 28.5 mm., from a caño ¾ km. west of Sinamaica, March 11.

U.S.N.M. No. 121541, 2 specimens, 22 to 26 mm., from Río Socuy, 3 km. above its mouth, February 24.

U.S.N.M. No. 121538, 37 examples, 10 to 30 mm., from a muddy pool tributary to the Río Gé near Rosario, Venezuela, collectors L. P. Schultz, Walter W. Butcher, and B. C. Refshauge, March 8, 1942.

This species was taken most frequently among aquatic plants in quiet waters and in swampy areas.

Description.—Based on the holotype and paratypes listed above, the former and one of the latter being carefully measured, and these measurements, expressed in hundredths of the standard length, are recorded below, first for the holotype, then for the paratype in parentheses. Standard length in mm. 27 (30.2).

Length of head 30.8 (28.8); greatest depth of body 33.6 (34.7); snout 7.78 (6.62); diameter of eye 11.1 (9.93); least width of interorbital space 11.1 (10.3); postorbital length of head 15.6 (14.6); least depth of caudal peduncle 12.6 (11.6); length of caudal peduncle 15.2 (14.3); length from tip of snout to rear of maxillary 10.4 (9.93); length of base of anal fin 25.2 (26.5); length of longest anal ray 18.5 (20.2); longest dorsal fin ray 25.9 (28.8); longest pectoral ray 20.7 (22.2); longest pelvic ray 18.5 (17.9); length of upper caudal fin lobe 31.5 (31.5) and of lower caudal fin lobe 33.4 (33.2); distance from snout

tip to dorsal origin 52.6 (53.0); snout to adipose origin 85.2 (86.8); snout to anal origin 65.2 (66.0); snout to pectoral insertion 27.8 (27.5); snout to pelvic insertion 47.8 (49.6); distance from dorsal origin to midcaudal fin base 53.0 (52.3); dorsal origin to tip of adipose fin 41.0 (47.0).

The following counts were made, respectively: Dorsal rays ii, 9 (ii, 9); anal iii, 17 (iii, 21); pectoral i, 13–i, 13 (i, 12–i, 12); pelvic i, 7–i, 7 (i, 7–i, 7); branched caudal rays 17 (17); number of scale rows from upper edge of gill opening to midcaudal base 31 (31); scales from origin of dorsal fin to last pore of lateral line 5 (5), and from pelvic base to last pore of lateral line 4 (4); scales in front of dorsal fin along middorsal line 10 (10); number of scales along one side of supraoccipital process 2½ (3). All the counts made for this new species are summarized in table 25.

Body compressed, its depth 2.8 or 2.9, head 3.4 or 3.5, in standard

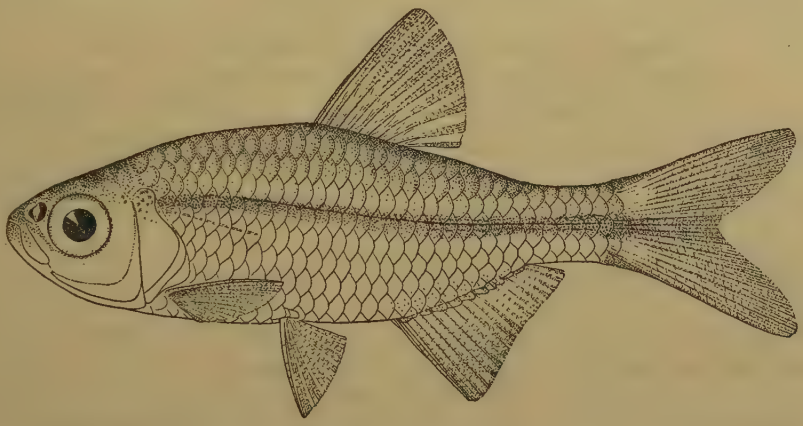


FIGURE 53.—*Hyphessobrycon sovichthys*, new species: Holotype, U.S.N.M. No. 121534 27 mm. in standard length.

length; lower profile of body a little more arched than dorsal profile; snout rounded, short, about 1.6 to 1.8 in eye, 4.5 in head; eye 3 in head and about equal to width of convex interorbital space; second suborbital covering cheek, without naked area behind and below where it joins the preopercle; adipose fin present; lateral line incomplete, of 9 or 10 pores; supraoccipital process short, usually bordered by about 2½ scales on each side; a large fontanel from between eyes to tip of supraoccipital process; mouth terminal oblique, lower jaw equal to upper or extending a trifle in front of snout tip and when closed mouth on level of middle of pupil; dorsal origin about equidistant between snout tip and midcaudal fin base; pelvic insertions in front of a vertical line through dorsal origin; anal origin usually a trifle behind a vertical line through base of last dorsal ray; adipose origin usually over base of second or third from last anal rays; anal origin an

equal distance between midcaudal fin base and pectoral insertion; pectoral fins reach to pelvic insertions and pelvics extend to anal origin; first branched ray of dorsal and of anal fins usually longest, about equal to last simple ray of these fins; first two rays of both paired fins about equal and longer than others; caudal fin deeply forked; distal margin of anal fin concave, that of dorsal a little rounded or truncate; usually adult males have small retrorse hooks on first 5 or 6 branched anal rays; base of caudal fin normally scaled, without small scales or enlarged ones developed out on the caudal fin lobes; gill rakers short, conical about 7+11 to 13; teeth all tricuspid, in two even rows on the premaxillary, the outer with 3 or 4 teeth and the inner always with 5 teeth; maxillary with one tooth; the maxillary bone is rather short, oblique, and barely reaches to a vertical through front of eye; maxillary from anterior angle to its rear tip about ⅔ eye; gill membranes free from isthmus; predorsal and prepelvic areas evenly and normally scaled; a single row of scales sheathing base of first six branched anal rays.

TABLE 25.—*Counts made on* Hyphessobrycon sovichthys

Number of fin rays												Number of teeth on each side of			
Dorsal	Anal							Pelvic	Pectoral			Premaxillary			Maxillary
												Outer row		Inner row	
ii, 9	iii, 15	iii, 16	iii, 17	iii, 18	iii, 19	iii, 20	iii, 21	i, 7	i, 11	i, 12	i, 13	4	3	5	1
10	1	5	5	10	9	7	2	6	2	2	2	3	9	12	12

Number of gill rakers on first gill arch			Number of scales					Number of pores in lateral line		
			On sides		Before dorsal	Below lateral line	Above lateral line			
7+11	7+12	7+13	30	31	10	4	5	8	9	10
1	4	1	2	6	4	4	4	1	4	2

Color.—Pale all over, with a wide, prominent black band or streak along midaxis from back of head to tip of middle caudal fin rays; tips of dorsal and of anal rays with several black pigment cells; a row of black pigment cells over each pterygiophore opposite anal fin; back with edges of scale pockets pigmented; snout and tip of lower jaw pigmented; peritoneum silver ventrally but dorsolaterally blackish.

Remarks.—Since Eigenmann (Mem. Mus. Comp. Zool., vol. 43, pt. 2, 1918) and Eigenmann and Myers (*ibid.*, pt. 5, 1929) revised the genus *Hyphessobrycon*, numerous new species have been described in

this genus. Many of these species are very similar to those already described and the genus is in need of a critical revision.

The new species here described and named *Hyphessobrycon sovichthys* is close to *H. poecilioides* in coloration but differs in lacking a humeral spot and in having more numerous anal rays, usually iii, 16 to iii, 21 instead of iii, 14 or iii, 15 in *poecilioides*. These two species are alike in having the black lateral streak continuous from behind head to tips of middle caudal fin rays. *H. sovichthys* has 30 or 31 scales and *H. poecilioides* has about 35 or 36 scales.

Since *H. sovichthys* has but one tooth on the maxillary, it differs from the following species: *H. coelestinus* Myers, in Eigenmann and Myers, 1929, which has 4 to 6 teeth; *H. iheringi* Fowler, 1941, *H. latus* Fowler, 1941, *H. innesi* Myers, 1936, which have 2 or 3 maxillary teeth. *H. sovichthys* in lacking a humeral spot or bar and also a black caudal spot differs from the following species: *H. balbus* Myers, 1927; *H. flammeus* Myers, 1924; *H. iheringi* Fowler, 1941; *H. maxillaris* Fowler, 1932; *H. schauenseei* Fowler, 1926; *H. innesi* Myers, 1936; *H. scholzei* Ahl, 1937; *H. peruvianus* Ladiges, 1938; *H. loretoensis* Ladiges, 1938; *H. maculicauda* Ahl, 1936; and *H. nigrifrons* Ahl, 1936. *H. ornatus* Ahl, 1934, has a large ornate black spot in the dorsal fin lacking in *H. sovichthys*. *H. iheringi* Fowler, 1941, has a black lateral band that ends in a large caudal spot. *H. piabinhas* Fowler, 1941, completely lacks a black lateral band as found in *H. sovichthys*. There are more numerous anal rays 22 to 24 in *H. peruvianus*, *H. loretoensis*, than in *sovichthys* and *H. maculicauda*, and *H. nigrifrons* have 32 or 33 scales instead of fewer.

Other species may be distinguished from *H. sovichthys*, except *H. poecilioides*, by tracing the new species through the key to this genus on pp. 172–176 of Eigenmann's revision (Mem. Mus. Comp. Zool., vol. 43, pt. 2, 1918).

Named *sovichthys* in honor of the Standard Oil Co. of Venezuela, which aided me in the collection of fishes during 1942 while I was in Venezuela.

Genus ASTYANAX Baird and Girard

Astyanax Baird and Girard, Proc. Acad. Nat. Sci. Philadelphia, vol. 7, p. 26, 1854. (Type, *Astyanax argentatus* Baird and Girard.)

KEY TO THE SPECIES OF ASTYANAX REPORTED FROM VENEZUELA (See table 26 for counts)

1*a*. Anal rays 18 or 19 (probably iii, 17 or iii, 18); scales 5–31–4; premaxillary with 2 or 3 teeth on each side in outer series and 5 in inner series; a small tooth at upper limit of maxillary; dorsal origin midway between snout tip and midcaudal fin base; sides silvery, with a darkish wide lateral band but no humeral or caudal spots are discernible; fins all clear.

Astyanax scintillans Myers

1*b*. Anal rays in greater number than iii, 21.

2*a*. The number of scales from upper edge of gill opening to midcaudal fin base 47 to 50, with 9 or 10 above lateral line and 7 or 8 below it to base of pelvics; anal rays iii, 26 to iii, 31; humeral spot vertically elongate with pale

areas behind and a smaller pale area in front; a silvery or darkish wide lateral band not continuing on caudal fin or at most only faintly discernible on midcaudal fin rays of young specimens; caudal spot absent, pectorals reaching to or a little past pelvic insertion; each side of premaxillary with 4 teeth in outer row and 5 teeth in inner row, the last outer tooth minute; maxillary with one tooth.

Astyanax abramoides Eigenmann

2*b*. Scales fewer than 45 from head to midcaudal fin base.

3*a*. Middorsal line in front of dorsal fin "naked," i. e., scale row along acute edge of predorsal midline lacking anteriorly, margins of normal-sized scales at sides not crossing midline but just in front of dorsal fin may occur a few scales on middorsal line; scales on midline of belly in front of pelvics normal; maxillary with none or (?) only one tooth on each side; dorsal origin equidistant between tip of snout and midcaudal fin base or a little closer to former; humeral spot black, oval shaped and sometimes with a vertically projecting streak of pigment below it, spot otherwise in a pale area extending nearly to midline of back; blackish lateral band forming an elongate triangular black caudal streak continuing to end of midcaudal fin rays; dorsal fin equal to head length; anal rays about iii, 27 to iii, 32; scales about 7 to 9–36 to 42–7 to 9;

Astyanax bimaculatus (Linnaeus)

3*b*. Middorsal line in front of dorsal fin with some scales along rounded or acute edge as large as those along its sides.

4*a*. Proximal end of maxillary with 5 or 6 teeth; color pattern consisting of distinct wavy brown streaks parallel with scale rows; humeral black spot distinct; black lateral dark band intense posteriorly on caudal peduncle and continuing to end of midcaudal fin rays; dorsal fin longer than head and pectorals reaching past pelvic insertions; first rays of dorsal elongate on males; anal rays iii, 27 to iii, 29; scales 40 to 42 from upper edge of gill opening to midcaudal fin base, usually 8 above and 6 below lateral line; gill rakers 9 or 10+12 to 14 on first gill arch_____**Astyanax superbus** Myers

4*b*. Proximal end of maxillary with only one or two teeth.

5*a*. Series of predorsal scales along middorsal line about half size of those at each side; midline of belly in front of pelvics with a row of minute or small scales, inner margins of adjoining row of normal-sized scales on each side with truncate margins that do not cross midline of belly; depth about 2 to 2.2 in standard length; 4 teeth in outer row and 5 in inner row on each side of premaxillary; dorsal fin much longer than head; humeral spot black surrounded by a pale area; black caudal spot oval but not continuing to end of midcaudal fin rays; anal rays iii, 29 to iii, 37, usually iii, 33 or iii, 34; scales 8–37 to 39–6 or 7.

Astyanax magdalenae Eigenmann and Henn

5*b*. Series of scales along middorsal line in front of dorsal fin of same size or nearly so as those in adjoining rows; scales on belly in front of pelvics normal in shape and in normal rows, not as in 5*a*; depth 2.5 to 3.1 in standard length.

4 teeth in outer row and 5 in inner row on each side of premaxillary; greatest depth in large adults 2 to 2.6 and in young 2.9.

6*a*. Black on middle caudal fin rays most intense on inner 4 rays of upper caudal fin lobe; practically no black pigment on inner ray of lower caudal lobe; a black band along base of anal continuing posteriorly to form black caudal spot, thence on middle

rays of caudal fin; this blackish anal band almost completely absent on large specimens; humeral spot represented by an oblique streak, with pale area behind it; origin of dorsal an eye diameter closer to snout tip than to midcaudal base or equidistant between them; outer row of premaxillary sometimes with 5 teeth; anal rays iii, 24 to iii, 30; scales 8 or 9–39 to 41–6 or 7; gill rakers usually 11+15 to 17 . . **Astyanax metae** Eigenmann

6*b*. Black elongate caudal spot continued on middle 3 or 4 caudal fin rays, not as in 6*a*; no blackish anal band extending into caudal spot, anal region instead distinctly pale; a vertically elongate humeral streak present, sometimes intensified a little above lateral line, bordered by pale areas in front and behind.

7*a*. Scales 7–36 to 38–5 or 6; anal rays iii, 23 to iii, 26; origin of dorsal only a trifle closer to tip of snout than to midcaudal base; depth 2.5 to 2.6 in standard length.

Astyanax fasciatus viejita (Valenciennes)

7*b*. Scales 8 or 9–40 or 41–6 or 7; anal rays iii, 24 or iii, 25; origin of dorsal about 1 to 1½ eye diameters closer to snout tip than to midcaudal fin base; depth 2.6 to 2.8 in standard length.

Astyanax venezuelae, new species

ASTYANAX SCINTILLANS Myers

Astyanax scintillans Myers, Ann. Mag. Nat. Hist., ser. 10, vol. 2, p. 88, 1928 (Playa Matepalma, Río Orinoco, Venezuela).

ASTYANAX ABRAMOIDES Eigenmann

Astyanax abramoides Eigenmann, Ann. Carnegie Mus., vol. 6, No. 1, p. 21, 1909 (Guianas).

Astyanax (*Poecilurichthys*) *abramoides* Eigenmann, Mem. Mus. Comp. Zool., vol. 43, pt. 3, p. 245, pl. 54, fig. 2, 1921 (Venezuela and Guiana).

Tetragonopterus abramis Steindachner, Denkschr. Akad. Wiss. Wien, vol. 41, p. 156, 1879 (Ciudad Bolívar).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 52, 1891 (Orinico).—Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 157, 1899 (Apure River, Venezuela).

Astyanax abramis Eigenmann and Allen, Fishes of western South America, p. 222, 1942 (Orinoco Basin).

U.S.N.M. No. 121452, 11 specimens, 52 to 97 mm. in standard length, collected by Leonard P. Schultz, G. Zuloaga, Roger Sherman, and William Phelps, Jr., May 12, 1942, in the Río Guárico and tributaries between San Sebastián and San Casimiro, Estado de Aragua, Venezuela.

ASTYANAX BIMACULATUS (Linnaeus)

Salmo bimaculatus Linnaeus, Systema naturae, ed. 10, p. 311, 1758 (South America). (Ref. copied.)

Astyanax bimaculatus Eigenmann, Indiana Univ. Stud., vol. 7, No. 44, p. 11, 1920 (Maracay, Río Bué; mouth Río Tapa; Río Castaño; Isla del Buro, Lake Valencia; Río Tiquirito, Concejo; all Venezuela).—Pearse, Univ. Wisconsin Stud., No. 1, p. 19, 1920 (Lake Valencia and mouth Río Bué, Venezuela).—Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 83, p. 408, 1931 (Guanoco; Río Yarapa at Yarapa; La Soledad; Pitch Lake at Guanoco, all Venezuela).

Tetragonopterus maculatus Peters, Monatsb. Akad. Wiss. Berlin, 1877, p. 472 (Calabozo, Venezuela).—Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 157, 1899 (Apure River).—Regan, Proc. Zool. Soc. London, 1906, vol. 1, p. 384, (Venezuela).

TABLE 26.—*Counts made on species of* Astyanax *from Venezuela*

Species	Number of fin rays																					
	Anal																Pectoral				Dorsal	
	iii, 23	iii, 24	iii, 25	iii, 26	iii, 27	iii, 28	iii, 29	iii, 30	iii, 31	iii, 32	iii, 33	iii, 34	iii, 35	iii, 36	iii, 37	i, 11	i, 12	i, 13	i, 14	ii, 9	
magdalenae (Maracaibo)							1	1	3	1	11	14	3	4	2	2	6	7		10		
bimaculatus (Río Guárico and Caripito)					1		3		3	1							1	1		5		
fasciatus viejita (Maracaibo)	2	6	7	3												1	1	7		36		
venezuelae (Río Torbes)		1	5															7	4	6		
superbus (Río Guárico)					3	1	2										1	7		6		
abramoides (Río Guárico)				1	3	4	3										2	5		6		
metae (Río Guárico and Caripito)		2	2	3	4	2	2	1								1	3	7	2	9		

Species	Number of scale rows from head to midcaudal fin base															Number of scales in reference to lateral line								Number of gill rakers on first gill arch							
																Above				Below				A			Below angle						
	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	7	8	9	10	5		7	8	9	10	11	12	13	14	15	16	17	18
magdalenae (Maracaibo)		3	6	4													6				1	5		1	6	6		2	5	4	1		1
bimaculatus (Río Guárico and Caripito)	1	2		1		1	1									1	3	1			4	1		1					1			
fasciatus viejita (Maracaibo)	2	6	2													7				1	6			1	2				2	1		
venezuelae (Río Torbes)					2	4											3	3			3	3				2				1	1		
superbus (Río Guárico)					2	2	2										6				6			1	3		2	1	1			
abramoides (Río Guárico)													4	5	2			2	2			2	2	1	4					4	1		
metae (Río Guárico and Caripito)				3	9	2												4	11		10	2				4		2		1	2	

U.S.N.M. No. 121451, a specimen 65 mm. in standard length, taken by L. P. Schultz, G. Zuloaga, Roger Sherman, and William Phelps, Jr., May 12, 1942, in the Río Guárico and tributaries between San Sebastián and San Casimiro, Estado de Aragua, Venezuela.

The following collections, made by Dr. William Beebe, were lent to me for study and report:

A specimen, 86 mm., Caripito, Venezuela, 1942.
Four specimens, 41 to 45 mm., Caripito, Venezuela, 1942.
Seven specimens, 26 to 35 mm., Caripito, Venezuela, 1942.

ASTYANAX SUPERBUS Myers

Astyanax superbus Myers, Stanford Ichth. Bull., vol. 2, No. 4, p. 92, fig. 2, 1942 (brook tributary to Río Tamanaco [tributary to Río Paye, Río Portuguesa drainage], Camoruco, 20 km. northeast of San Carlos, Venezuela).

U.S.N.M. No. 121454, 5 specimens, 70 to 95 mm. in standard length, collected by Leonard P. Schultz, March 31, 1942, in the Río Torbes, 1 km. above Táriba, Venezuela (Orinoco system).

ASTYANAX MAGDALENAE Eigenmann and Henn

Astyanax magdalenae Eigenmann and Henn, Ann. Carnegie Mus., vol. 10, p. 89, 1916 (Girardot).

The specimens from the Maracaibo Basin have a few small preventral scales along the midline of the breast and a similar arrangement along the predorsal midline of back; the humeral spot is black, larger than pupil, with a whiff of smokelike pigment off the posterior-dorsal side, this black spot being set off by a large pale area in front and behind; the pale area behind the black spot is margined posteriorly by an intensification of pigment; the dark or silvery lateral band begins behind the wide pale area behind the black humeral spot; the caudal spot is black, always very intense, horizontally oval, but not continuing on middle caudal fin rays; the profile is slightly concave near a vertical line through rear of orbit then convex to dorsal fin; depth 2.0 to 2.2 and head 3.4 to 3.6, in standard length; the distance from dorsal origin to tip of snout is a little shorter than from dorsal origin to midcaudal base. Table 26 gives numerous counts made on this species from the Maracaibo Basin.

It is likely that the population of this form in the Maracaibo Basin is statistically different from that in the Magdalena Basin, but no specimens of the latter are available for study at present, so it seems best to identify my specimens as *A. magdalenae*.

The following collections were made by Leonard P. Schultz in the Maracaibo Basin of Venezuela during 1942:

U.S.N.M. No. 121424, 19 specimens, 40 to 92 mm. in standard length, taken in the Río Socuy, 3 km. above the mouth, February 24.

U.S.N.M. No. 121430, 6 examples, 68 to 94 mm., from the Río Motatán at bridge, 22 km. north of Motatán, March 17.

U.S.N.M. No. 121426, a specimen, 76 mm., taken in the Río Jimelles, 12 km. east of Motatán, March 24.

U.S.N.M. No. 121429, 8 specimens, 57 to 75 mm., from the Río San Juan about 12 km. south of Rosario, February 26.

U.S.N.M. No. 121433, 13 examples, 48 to 100 mm., from the Río Palmar near Totuma, about 100 km. southwest of Maracaibo, February 21.

U.S.N.M. No. 121425, 6 examples, 41 to 82 mm., from a caño ¾ km. west of Sinamaica, March 11.

U.S.N.M. No. 121431, 11 examples, 46 to 106 mm., Río Machango at bridge south of Lagunillas, March 16.

U.S.N.M. No. 121434, a specimen, 81 mm., Río Motatán, 4 km. above Motatán, March 25.

U.S.N.M. No. 121435, 19 specimens, 58 to 86 mm., Río Palmar at bridge, 70 km. southwest of Maracaibo, March 6.

U.S.N.M. No. 121427, 8 specimens, 66 to 81 mm., from Río San Juan near bridge, tributary Río Motatán, March 20.

U.S.N.M. No. 121428, 27 examples, 60 to 85 mm., Río Apón about 35 km. south of Rosario, February 26.

U.S.N.M. No. 121432, 49 examples, 43 to 85 mm., Lago Tulé about 75 km. west of Maracaibo, 5 km. from Río Socuy, March 1.

U.S.N.M. No. 121436, 82 specimens, 48 to 112 mm., Río Negro below mouth of Río Yasa, March 2.

ASTYANAX METAE Eigenmann

Astyanax metae Eigenmann, *in* Eigenmann, Henn, and Wilson, Indiana Univ. Stud., No. 19, p. 11, 1914 (Río Negro, Villavicencio, Colombia); Indiana Univ. Stud., vol. 7, No. 44, p. 11, 1920 (Río Castaño; Río Bué; Concejo, Río Tiquirito and Río Tuy; mouth Río Tapa Tapa, Venezuela).—Pearse, Univ. Wisconsin Stud., No. 1, pp. 19, 42, 1920 (Lake Valencia, Río Castaño, Venezuela).—Eigenmann, Mem. Carnegie Mus., vol. 9, No. 1, p. 235, 1922 (Lake Valencia, Río Tuy Basin, Venezuela).

U.S.N.M. No. 121453, 9 specimens, 54 to 110 mm. in standard length, collected by L. P. Schultz, G. Zuloaga, Roger Sherman, and William Phelps, Jr., May 12, 1942, in the Río Guárico and tributaries, between San Sebastián and San Casimiro, Estado de Aragua, Venezuela.

One specimen, 83.5 mm., Caripito, Venezuela, William Beebe, 1942, was lent to me for study and report.

ASTYANAX FASCIATUS VIEJITA (Valenciennes)

Tetragonopterus viejita Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 22, p. 154, 1849 (Lake Maracaibo).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 53, 1891 (Lago Maracaibo).—Ulrey, Ann. New York Acad. Sci., vol. 8, p. 288, 1895 (Lake Maracaibo).

Astyanax fasciatus Myers, Copeia, 1932, No. 3, p. 137 (Cúcuta Lake, Maracaibo drainage).

The following collections were made by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121448, 166 specimens, 30 to 80 mm. in standard length, Río San Pedro at bridge south of Mene Grande, Motatán system, March 20.

U.S.N.M. No. 121439, 8 examples, 30 to 40 mm., caño ¾ km. west of Sinamaica, March 11.

U.S.N.M. No. 121447, 12 examples, 37 to 63 mm., Lago Tulé about 75 km. west of Maracaibo, tributary to Río Socuy, March 1.

U.S.N.M. No. 121442, 4 specimens, 42 to 53.5 mm., from Río San Juan, 12 km. south of Rosario, Estado de Zulia, February 26.

U.S.N.M. No. 121446, 3 specimens, 32.5 to 73.5 mm., Río Socuy, 3 km. above its mouth, February 24.

U.S.N.M. No. 121444, 2 examples, both 48 mm., Río Negro below mouth of Río Yasa, March 2.

U.S.N.M. No. 121445, a specimen, 62 mm., Río Motatán, 8 km. below Motatán, March 24.

U.S.N.M. No. 121440, 3 examples, 27.5 to 41 mm., Río Machango at bridge south of Lagunillas, March 16.

U.S.N.M. No. 121441, a specimen, 36 mm., Río Táchira, 7 km. north of San Antonio (Catatumbo system), April 1.

U.S.N.M. No. 121443, 6 examples, 26 to 69 mm., Río Motatán at bridge 22 miles north of Motatán, March 17.

The following specimen was collected by Nicéforo María:

U.S.N.M. No. 101600, 97 mm., Río Pamplonita near Cúcuta, Colombia.

Seven specimens, F. M. N. H. Nos. 42002-42008, Río Cogollo, Sierra Perijá, Maracaibo Basin, Osgood and Conover, March, 1920, were lent to me for study and report by the Chicago Natural History Museum.

When alive, the following color notes were recorded for this species: Anal fin dull red anteriorly, yellowish posteriorly; the outer half of first anal ray white, middle rays of caudal fin yellowish, lower rays dull reddish; pectorals yellowish; pelvics pinkish; upper part of eye yellow; head with yellow reflections.

ASTYANAX VENEZUELAE, new species

FIGURE 54

Holotype.—U.S.N.M. No. 121449, a specimen 86.5 mm. in standard length, collected by Leonard P. Schultz, March 31, 1942, in the Río Torbes, 1 km. above Táriba, Orinoco system.

Paratypes.—U.S.N.M. No. 121450, 5 specimens, 76 to 90 mm., taken along with the holotype and bearing same data.

Description.—Detailed measurements were made on the holotype and one paratype, and these data are recorded in hundredths of the standard length, first for the holotype, then for the paratype in parentheses, respectively. Standard lengths in mm. 86.5 and 75.

Length of head 26.8 (27.1); greatest depth of body 36.3 (36.8); length of snout 7.52 (7.20); diameter of eye 7.52 (8.67); length of maxillaries 9.83 (10.0); interorbital space 9.14 (9.20); postorbital length of head 13.5 (12.7); least depth of caudal peduncle 11.6 (12.3); length of caudal peduncle 15.7 (14.9); least preorbital width 1.85 (2.0); length of anal fin base 26.6 (25.6); length of longest anal rav

14.5 (15.5); longest dorsal ray 23.5 (25.6); longest pectoral ray 20.5 (21.5); longest pelvic ray 15.1 (16.1); longest ray of upper caudal lobe 27.8 (– –); longest ray of lower caudal lobe 28.9 (28.4); distance from tip of snout to dorsal origin 49.0 (49.0); snout to anal origin 65.4 (65.4); snout to adipose origin 85.1 (86.4); snout to pectoral insertion 24.3 (26.2); snout to pelvic insertion 46.2 (48.0); snout to anus 60.7 (61.4); distance from dorsal origin to midcaudal base 56.2 (59.3).

The following counts were made, respectively: Dorsal rays ii, 9 (ii, 9); anal iii, 24 (iii, 25); pectoral i, 13–i, 13 (i, 13–i, 13); pelvic i, 7–i, 7 (i, 7–i, 7); branched rays of caudal fin 17 (17); gill rakers on first

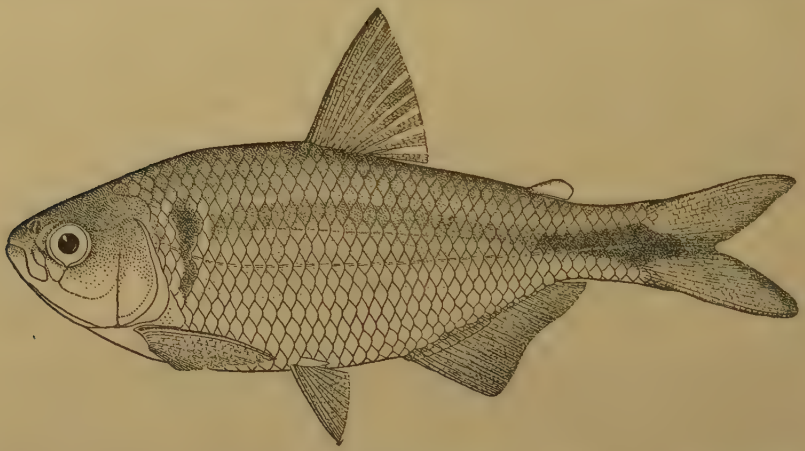


FIGURE 54.—*Astyanax venezuelae*, new species: Holotype, U.S.N.M. No. 121449, 86.5 mm. in standard length.

gill arch – – (11+1+14); scales from upper edge of gill opening to midcaudal fin base 40 (40); scales from dorsal origin to lateral line 8 (9), and from lateral line to pelvic base 6 (7); scales in front of dorsal to tip of supraoccipital process 12 (12), and along side of that bony process 4 (4); zigzag scale rows around caudal peduncle 16 (18); number of teeth in outer row of the premaxillary – – (5–5; 4–5; 5–5; 5–5; 5–5), and in inner row of premaxillary always 5 on each side; proximal end of maxillary with one tooth; all teeth 3- to 5-pointed, middle cusp longest.

Body compressed, its depth about 2.6 to 2.8, head 2.8 to 2.9, snout to dorsal 2.1 to 2.2, all in the standard length; origin of dorsal closer to tip of snout than to midcaudal fin base by more than diameter of eye; second suborbital not quite meeting the preopercle so that a narrow naked space occurs around it; mouth evenly rounded, not pointed, the snout about equal to the eye; preorbital with a shallow depression to receive the posterior part of the maxillary; interorbital space convex; mouth when closed on level of lower edge of pupil; lateral line a little decurved anteriorly, complete, the scale rows

parallel with lateral line but not quite so with anal base; anal base sheathed with two rows of scales anteriorly, one posteriorly; belly normally scaled, rounded; predorsal area more or less rounded, hardly bluntly keeled, normally scaled, the middle row of scales similar to those along the adjacent upper sides; length of predorsal process about 3 times in the distance from its tip to dorsal origin; distal margins of dorsal and of anal fins a little concave; first branched rays of dorsal, anal, pectoral and of pelvics longest, the first dorsal rays of males longer than for females; caudal fin forked; origin of anal fin a little behind base of last dorsal ray; origin of adipose fin over the base of the eighteenth to twentieth anal ray; pectorals scarcely or not reaching pelvic insertion and pelvics reaching to anus but not quite to anal origin; length of caudal peduncle a little longer than its least depth; least depth of caudal peduncle about 2.2 to 2.3 in the head.

Color.—Silvery on lower sides, upper sides and back brownish; the wide dark lateral band is faint but the elongate caudal "spot" is black and continues to end of middle (3 or 4) caudal fin rays; the outer tips of anal rays are black pigmented; inside of operculum with dark pigment; peritoneum blackish; humeral spot vertically elongate extending from above lateral line where the pigmentation is greatly intensified to over base of pectoral fin, an area in front of this humeral streak pale and another wider one behind it.

Remarks.—This new species resembles *A. fasciatus* in coloration, but the dorsal is farther forward, by over an eye diameter; the dorsal position is similar to that in *A. metae* and *A. maximus* but differs from them in having a well-defined humeral spot as in *fasciatus*. The five teeth in the outer row on each side of the premaxillary separate it from *A. regani* and *A. albeolus*.

This species could be lined up with *fasciatus* if the dorsal were in the middle of the length of the body without caudal fin.

This species lived among the rocks and rubble in swiftly flowing water. It is named *venezuelae* after the country in which it was collected.

Genus HEMIBRYCON Günther

Hemibrycon GÜNTHER, Catalogue of the fishes in the British Museum, vol. 5, pp. 318, 330, 1864. (Type, *Tetragonopterus polyodon* Günther.)

The species of *Hemibrycon* from Venezuela are all closely related, and I identify them as subspecies of *dentatus* on the basis of the much-decurved lateral line. This character needs further consideration and comparison among the various species, as it appears to become more decurved with age as the body gets deeper and deeper. Certain species of *Hemibrycon* have been recognized almost wholly on the basis of depth in length, but I find in the large series of *Hemibrycon* from the Maracaibo Basin a profound difference in depth with age, the adult

TABLE 27.—*Counts made on species of* Hemibrycon

Species	Number of fin rays																			
	Dorsal		Anal											Pelvic			Pectoral			
	ii, 8	ii, 9	iii, 23	iii, 24	iii, 25	iii, 26	iii, 27	iii, 28	iii, 29	iii, 30	iii, 31	iii, 32	iii, 33	i, 6	i, 7	i, 8	i, 10	i, 11	i, 12	i, 13
dentatus dentatus	x								x	x	x	x	x							
dentatus metae	23	1				8	13	16	3	1				2	28	4		4	9	1
dentatus jabonero	24		1	8	17	12	6								15		1	13	10	

Species	Number of scales												Number of gill rakers on first gill arch								Number of teeth				
	Rows crossing lateral line								Above lateral line		Below lateral line		Above angle			Below angle					Premaxillary				
																					Outer row				Inner row
	41	42	43	44	45	46	47	48	7	8	5	6	6	7	8	9	10	11	12	13	3	4	5	6	4
dentatus dentatus					x	x	x	x	x	x	x	x			1	1						x	x	x	x
dentatus metae		4	8	3					2	2	1	3	1	2					1	2	1	7	1		8
dentatus jabonero	5	7	2	1					7		6	1		6	4		3	3	2	2		4	5	1	10

females with mature eggs being deepest, their depth about 2.6 to 3 in the standard length, whereas the immature are slenderer, often 3.3.

Another character very variable with age is the number of teeth on the maxillary. These teeth number about 2 or 3 in the young and increase in number with age until about 11 are formed in the largest specimens.

Hemibrycon in Venezuela occurs most frequently in the mountain streams among rubble and in rock pools and less frequently at lower elevations.

KEY TO THE SPECIES OF HEMIBRYCON FROM VENEZUELA

1*a*. Number of scale rows crossing the lateral line 45 to 48; anal rays iii, 29 to iii, 33 (see table 27)_____**Hemibrycon dentatus dentatus** Eigenmann [32]

1*b*. Number of scale rows crossing lateral line 42 to 44, usually 43; anal rays iii, 26 to iii, 30, usually iii, 26 to iii, 28_____**Hemibrycon dentatus metae** Myers

1*c*. Number of scale rows 41 to 44, usually 42; anal rays iii, 23 to iii, 27, usually iii, 24 to iii, 26_____**Hemibrycon dentatus jabonero**, new subspecies

HEMIBRYCON DENTATUS METAE Myers

Hemibrycon metae Myers, Proc. Biol. Soc. Washington, vol. 43, p. 68, 1930 (Guaicaramo, Río Guavio, Colombia).

? *Hemibrycon taeniurus* (not Gill) Eigenmann, Indiana Univ. Stud., vol. 7, No. 44, p. 11, 1920 (Concejo, Río Tuy and Río Tiquirito, Venezuela).—Eigenmann, Mem. Mus. Comp. Zool., vol. 43, No. 4, p. 412 [?] pl. 39, fig. 2, 1927 (Concejo, Río Tuy and Río Tiquirito, Venezuela).

U.S.N.M. No. 121467, 117 specimens, 40 to 77 mm. in standard length, collected by Leonard P. Schultz, March 31, 1942, in the Río Torbes, 1 km. above Táriba, Venezuela (Orinoco system).

U.S.N.M. No. 121466, 18 examples, 35 to 51 mm., taken by L. P. Schultz, G. Zuloaga, Roger Sherman, and William Phelps, Jr., May 12, 1942, in the Río Guárico and tributaries between San Sebastián and San Casimiro, Estado de Aragua, Venezuela.

HEMIBRYCON DENTATUS JABONERO, new subspecies

Figure 55

Holotype.—U.S.N.M. No. 121455, a female, 96 mm. in standard length, collected by Leonard P. Schultz, April 3, 1942, in the Río Chama at Estanques, Estado de Mérida, Venezuela.

Paratypes.—All the paratypes were collected by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121460, 52 examples, 39 to 96 mm. in standard length, collected along with the holotype and bearing same data.

U.S.N.M. No. 121458, 2 examples, 47 and 57 mm., Río Chama, 10 km. below Lagunillas, Estado de Mérida, March 30.

U.S.N.M. No. 121456, 601 specimens, 27 to 115 mm., Río Gonzáles, tributary to Río Chama, at La Gonzáles, Estado de Mérida, March 29.

[32] Not reported from Venezuela.

U.S.N.M. No. 121465, 25 examples, 26 to 66 mm., Río Motatán, 4 km. above Motatán, March 25.

U.S.N.M. No. 121463, 9 specimens, 31.5 to 60 mm., Río San Pedro at bridge, Motatán system, March 20.

U.S.N.M. No. 121464, 2 specimens, 24 and 59 mm., Río Motatán, 8 km. below Motatán, March 24.

U.S.N.M. No. 121457, 11 examples, 27 to 51.5 mm., Río Jimelles, 12 km. east of Motatán, Motatán system, March 24.

U.S.N.M. No. 121461, a specimen, 53 mm., Río Táchira, 7 km. north of San Antonio, Catatumbo system, April 1.

U.S.N.M. No. 121459, 4 examples, 24 to 37 mm., Río Palmar near Totuma, about 100 km. southwest of Maracaibo, February 21.

U.S.N.M. No. 121462, 3 examples, 23 to 25 mm., Río Motatán at bridge, 22 km. north of Motatán, March 17.

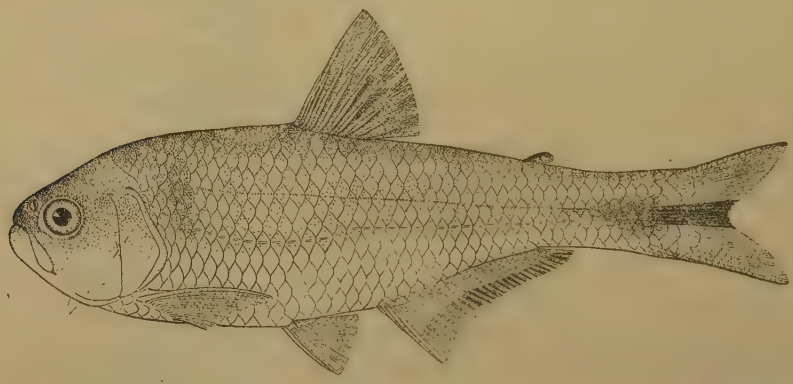


FIGURE 55.—*Hemibrycon dentatus jabonero*, new subspecies: Holotype, U.S.N.M. No 121455, 96 mm. in standard length

With uncertainty I am referring to this species a specimen from Río San Pedro at bridge, south of Mene Grande, collected March 20, 1942 (U.S.N.M. No. 121563), 59 mm. in standard length, not as a paratype, because it has the second suborbital not in contact with preopercle. The fin rays are anal iii,24; dorsal ii,8; pelvic i,7-i,7; pectoral i,12-i,12; scales 41, 7 above and 5 below lateral line; teeth 5–5 in outer row, 4–4 in inner row on premaxillaries; maxillary with about 5 teeth.

Description.—Based on the holotype and paratypes listed above. Detailed measurements were made on the holotype and one paratype, and these data are recorded below in hundredths of the standard length, respectively, for the holotype and the paratype in parentheses. Standard length in mm. 96 (86).

Length of head 26.0 (26.7); greatest depth 32.8 (34.9); length of snout 7.29 (6.04); diameter of eye 7.08 (8.14); length of maxillaries from tip of snout to rear tip of maxillary 11.7 (11.2); interorbital width 9.38 (8.84); postorbital length of head 14.8 (14.5); least depth

of caudal peduncle 12.1 (11.0); length of caudal peduncle 16.7 (15.7); least width of preorbital 1.56 (1.74); length of anal fin base 29.7 (31.0); length of longest anal fin ray 13.0 (14.0); longest dorsal ray 20.3 (21.5); longest pectoral ray 20.3 (22.1); longest pelvic ray 12.7 (—); length of upper caudal fin lobe 26.0 (25.1); and of lower lobe of caudal fin 24.5 (24.9); distance from snout tip to dorsal origin 49.8 (53.5); snout to anal origin 59.9 (62.8); snout to adipose origin 83.5 (85.6); snout to pectoral insertion 25.0 (25.6); snout to pelvic insertion 45.3 (47.9); snout to anus 55.5 (58.1); dorsal origin to midcaudal fin base 55.6 (52.3).

The following counts were made, respectively: Dorsal rays ii, 8 (ii, 8); anal iii, 25 (iii, 26); pectoral i, 11–i, 11 (i, 12–i, 12); pelvic i, 7–i, 7 (– –); gill rakers – – (8+13); scales 41 (41); scales above lateral line 7 (7) and below it to pelvic base 5 (5); scales before dorsal – – (16); teeth in outer row of premaxillary 5—4 (5—4) and in inner row 4—4 (4—4); teeth on maxillary 11—10 (11—10); scales along one side of occipital process 2 (2).

Body and head compressed; the lower jaw prominent, equal to upper; mouth when closed a little above lower edge of pupil; lower edge of second suborbital in contact with preopercle; snout bluntly rounded, not so long as diameter of eye, about 1.7 to 1.9 in latter and 4.0 to 4.2 in head; eye 3.1 to 4.1 in head; interorbital convex, a little wider than eye, about 2.9 to 3.3 in head; preventral and predorsal area rounded, normally scaled; maxillary reaches to under front of pupil but not quite to suture between first and second suborbitals; lateral line complete, decurved anteriorly; anal rays of males with numerous spinules directed basally; base of anal sheathed with a row of scales anteriorly; base of caudal fin scaled a little over ⅓ out on middle of lobes; origin of dorsal an equal distance or a trifle closer to tip of snout than to midcaudal fin base; adipose fin origin over base of about next to last fourth or fifth anal fin ray; anal origin under about base of last dorsal fin ray; pelvic insertion a little closer to snout tip than to rear of anal fin base; distal margin of anal fin a little concave, that of dorsal and pelvics truncate, and of pectoral concave, the latter fin pointed; pectorals usually not quite reaching to pelvic insertions, and pelvics reaching past anus but not quite to anal origin; the last simple ray and first branched ray of dorsal and anal fins longest, and first two rays of paired fins longest; usually the dorsal profile is a little less curved than the ventral profile; the maxillary teeth are very variable in number, about 3 in the young and 11 in the largest adults.

Color.—The following color notes were recorded soon after this species was removed from the water: Iris yellowish; margin of operculum yellowish or orange; sides of back yellowish, becoming bright yellow-orange on caudal fin and extending as a band to tip of rays; middle caudal rays blackish, below which is another orange band

similar to the dorsal one; outer third of caudal lobes dull red; adipose fin dull red; base of dorsal orange; pelvics yellowish; humeral spot an elongate blackish streak, fainter in adults; the lateral band is silvery on adults but brownish on the young; just inside of anal margin is a narrow brownish streak and another one along anal fin base.

Remarks.—This new subspecies may be recognized from the other subspecies of *dentatus* by its fewer average number of anal rays and fewer scales, as indicated in the table and in the key.

Named *jabonero* after the common name by which this fish was called in the upper Río Chama Valley.

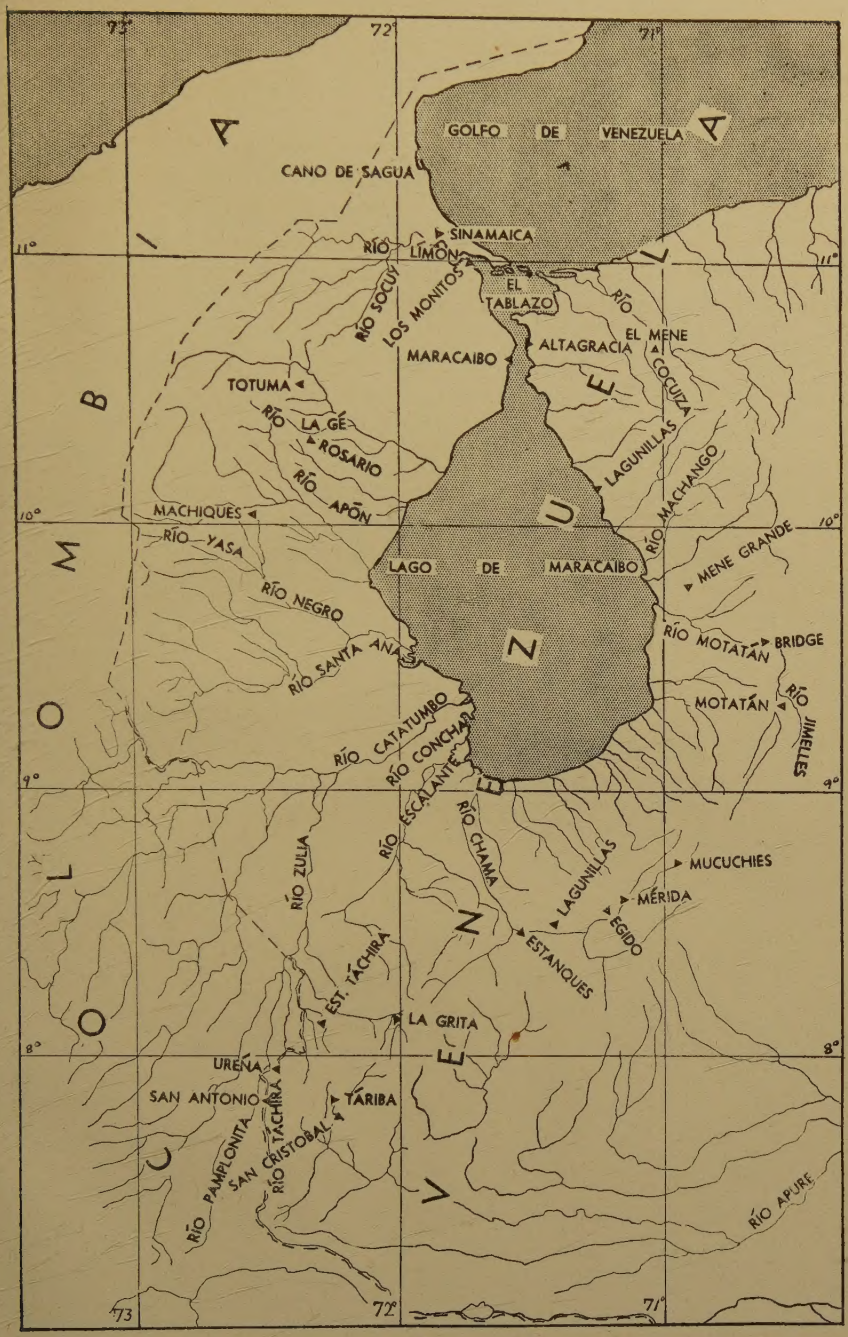
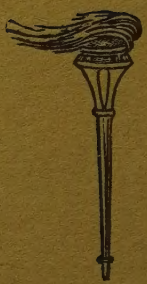


FIGURE 56.—Map of the Maracaibo Basin of Venezuela, showing the river systems, collecting localities visited by the author in 1942, and other localities recorded in this report.

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